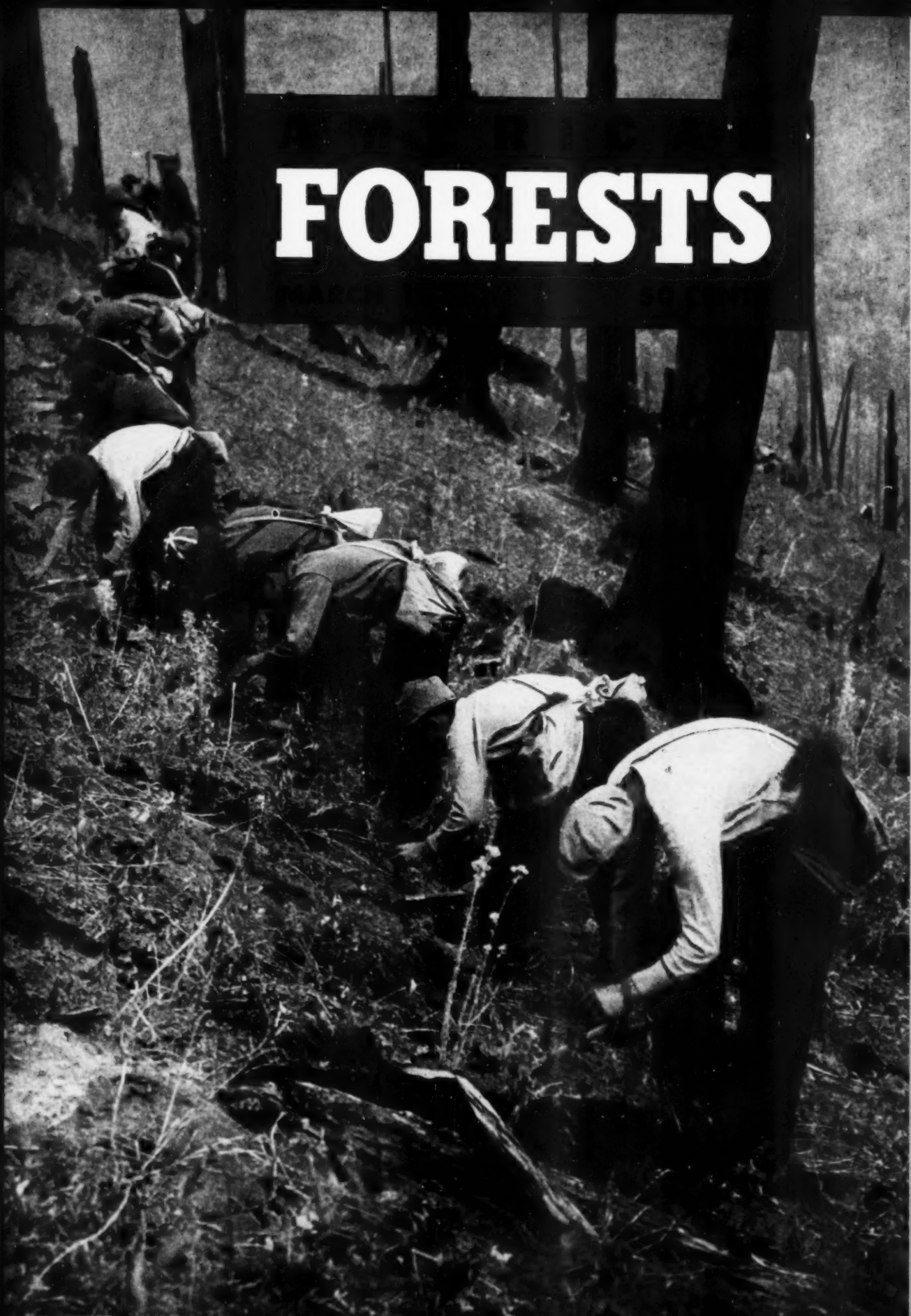


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The American Forestry Association is a national organization—independent and non-political in character—for the advancement of intelligent management and use of forests and related resources of soil, water, wildlife and outdoor recreation. Its purpose is to create an enlightened public appreciation of these resources and the part they play in the social and economic life of the nation. Created in 1875, it is the oldest national forest conservation organization in America.

FORESTS

PUBLISHED BY THE AMERICAN FORESTRY ASSOCIATION

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THE COVER

Planting America is the theme of this month's cover. True, it lacks the scenic appeal of past cover selections. Charred timber seldom is scenic. Nevertheless, we believe this thin line of tree planters working on burned-over Idaho timberland will pack an inspirational wallop for thousands of Americans who want to see such lines extended across the breadth of the nation. For that is what it will take to do the planting job that has to be done in this country. This photo is the work of K. D. Swan, who retired from the U. S. Forest Service in 1947 after thirty-six years of service. He was the dean of the Service corps of shutter experts.

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WOOD TECHNOLOGY

Vol. I—Structure, Identification, Defects, and Uses of the Commercial Woods of the United States

By H. P. BROWN, The New York State College of Forestry, Syracuse University; A. J. PANSIN, Department of Forestry, Michigan State College; and C. C. FORSAITH, The New York State College of Forestry, Syracuse University. *American Forestry Series*. 634 pages, \$6.00

This book is a complete rewriting and revision of Brown and Pansin's well known *Identification of the Commercial Timbers of the United States*. It will be followed by a second volume dealing with the physical, mechanical, and chemical properties of wood. Together, the volumes will constitute a complete treatment of the subject matter of wood technology. Vol. I covers factual information on the structure, identification, general properties, uses, and major defects of commercial woods in the United States. All material has been brought up to date, clarified and presented in more logical sequence.

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LETTERS-TO THE EDITOR

We Hope You Will, Mr. Disney

I was sincerely surprised, but nonetheless appreciative, upon receiving your letter informing me of my election as an Honorary Vice-President of The American Forestry Association.

For years I have been conscious of the fine work the Association has been doing in protecting our forest lands and in fighting for reforestation. In fact, when I included Joyce Kilmer's *Trees* in our last picture, *Melody Time*, I tried to express my own feelings in this regard.

I hope some time I will be able to sit in with your directors at one of their meetings.

Walt Disney

Burbank, California

More on Wood Preservation

In the January issue, Professor Fritz states "that no preservative, however good, is effective unless it is injected into the wood under pressure." Such a statement can defeat the purpose which he apparently had in mind when he wrote the letter to the editor.

Pressure treatment of wood with proper preservatives will delay wood decay longer than treatment of wood by brushing, dipping, or soaking. However, there are situations where, if any application of a preservative is to be made, it must be done by one of the three last named methods. Carefully brushing, dipping, or soaking wood in a properly selected wood preservative, followed by treating all newly exposed surfaces of the piece, will afford protection and extend the service life of the wood far beyond that of the untreated timbers.

Seed flats brushed with copper naphthenate in our college greenhouses are free of decay, whereas the untreated controls have decayed beyond the point of being serviceable. Soaking fence posts in wood preservatives to delay decay is a standard practice and has proved worthwhile. Preliminary tests by the federal Division of Forest Pathology indicate that the brush treatment of wood not in contact with soil is practical in delaying decay.

The conservation of wood is important. The cost of replacing wood

in service is expensive. The proper selection and application of good wood preservatives will extend the service life of wood appreciably. Although pressure treatment is the best method, applications of wood preservatives by brushing, dipping, and soaking are worthwhile under many situations.

Ray R. Hirt

New York State College of Forestry
Syracuse, N. Y.

A Forestry Consultant Speaks

We have just read Mr. Samuelson's letter in the January issue relative to the need for more farm foresters. On this we would agree, but farm foresters alone cannot bring about better woodland management. Many farmers and other woodland owners are fairly well aware of what constitutes good woodland practice; they are also intelligent enough to be able to read and to apply what they read in the various non-technical bulletins available to them.

Most of them realize that over a long period of time the increment on better trees of the most valuable species will more than pay for the cost of stand improvement but, actually, very few have the money or the time to invest on the scale that it must be invested in an operation that produces little if any presently merchantable material. The market for firewood has almost disappeared in favor of fuel oil even in the strictly rural areas, and all other uses of low-grade and small timber are infinitesimal in comparison to the potential supply in most sections.

Forestry Associates, Incorporated has been in the forestry consulting and operating field for several years and in this time has never been called upon to mark for cutting or to manage any of the many small woodlots in great need of timber stand improvement. This despite the fact that its foresters charge less for their services than does the local plumber.

We have had many planting contracts for the establishment of new forests, but on the whole these have been performed for professional men in the cities who have purchased some land and who have had the money to have it afforested. Some work has been done for farmers who could

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- July 26-August 5—Sawtooth Wilderness, Idaho—\$179
- August 3-15—Maroon Bells-Snowmass Wilderness, Colorado—\$178
- August 9-19—Sawtooth Wilderness, Idaho—\$179
- August 15-27—Cascade Crest Wilderness, Washington—\$188
- August 18-30—Maroon Bells-Snowmass Wilderness, Colorado—\$178
- August 20-September 1—Olympic Wilderness, Washington—\$184
- August 28-September 8—Inyo-Kings Wilderness, California—\$164
- August 29-September 11—Pecos Wilderness, New Mexico—\$212
- August 29-September 10—Cascade Crest Wilderness, Washington—\$188
- September 6-17—Great Smokies Wilderness, North Carolina and Tennessee—\$180

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THE AMERICAN FORESTRY ASSOCIATION

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finance planting in large measure by the use of subsidized nursery stock and AAA benefit payments. But again we repeat that we have not taken in one dollar on what we expected would constitute a major aspect of our work—the management of the heavily culled local hardwood stands on farms.

The greatest obstacles to good management are economic conditions. New uses of low-grade materials at higher prices in small decentralized plants would serve to increase the practical application of what foresters know. Market prices for all forest products are determined in part by the production costs of the most efficient operators, and this means by the costs encountered by those who cut clean and get out.

It seems to us that part of the solution may lie in greater public control over private land use or subsidy for good management. Either of these courses would lead to temporary increases in the prices of forest products, the first directly upon the user and the second indirectly through increased taxation necessary to finance the subsidy program. It may well be, however, that the end result of an assistance or regulation program would be decreased cost of forest products due to larger volumes of higher grade merchantable materials on the same acreage and attendant lower harvesting costs.

Education alone cannot be effective. We may know what we should do with our woodlands and why and how, but unless we can stay solvent in the process of improvement of our timber stands, very little will be done. Farm foresters and other public and private foresters might well spend more effort in development of markets, products and processes designed to utilize, near to the point of production, low-grade material from the forests.

*Eugene R. Kuhne, President
Forestry Associates, Inc.*

Hart, Michigan

AUTHORS

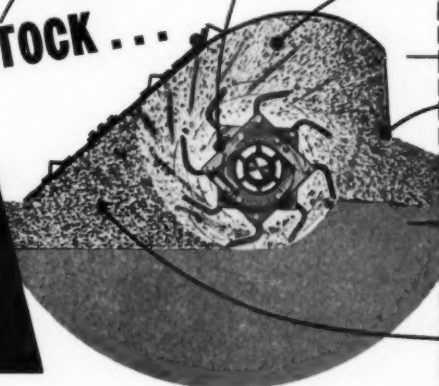
ROBERT O. BEATTY (*Outdoorsmen in the Making*) is associated with the Izaak Walton League. **ARTHUR H. CARHART** (*Mass Murder in the Spruce Belt*), well-known writer-conservationist, headquarters in Denver. **J. A. COPE** (*We Make a Sauna*) is extension forester of New York. **M. A. HUBERMAN** (*Forests in Ferment*) is a United Nations forester. **ISABELLE F. STORY** (*Park of Peace*) is editor of the National Park Service.

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Photo by S.C.S.

THE PLANTING MACHINE—One key to past successes of the American economy has been an aptitude for forging the right instrument for carrying out the biggest jobs. In this respect the tree planting machine belongs in the same category as the cotton gin. Its impact has already been revolutionary; its potentialities are enormous. Once again, Americans have the right tool for one of their major jobs—that of planting nearly 100 million acres of denuded land

By ERLE KAUFFMAN

FOR nearly a quarter century America has been at the threshold of a major tree planting program without opening the door. Why?

Not because the American people are unprepared or unwilling to support such a program. Tree planting is a conservation activity that appeals strongly to the average citizen, partly because it is something he can do himself, even in his own backyard, and partly because tree planting has been successfully propagandized over the years.

Not because we lack incentive. Of the 656 million acres of forest-producing lands in this country, seventy-three million acres, or one acre out of nine, is denuded or so poorly stocked with trees that it must be artificially replanted before it again can contribute to the economy of the nation. Considering only commercial forest land, the ratio is one acre to six. An additional twenty million acres of marginal farm lands are in need of planting for soil restoration and other purposes.

Not because we lack technical know-how. President Truman played heavily on this point in his inaugural address when he offered to share our "imponderable resources of technical knowledge" to further his program of peace, plenty and freedom to the peoples of the world. True, there is much we do not as yet know about tree growth and culture, primarily in the fields of tree selection and breeding. But we know more than enough to restore our denuded forest lands to productivity.

We know how to produce good strains of trees in our tree nurseries. New techniques and mechanization give promise to vastly greater production—and at lower costs. In many regions, particularly in the South and Lake States, ingenious machines now can plant young tree seedlings at a rate far exceeding the dreams of old-time tree planters. And we are ex-

Planting America

With one out of every six acres of wood-producing land depleted, it's time we stopped dabbling in tree planting. A vigorous nationwide reforestation project is needed—and needed now—to grow the lumber for tomorrow's homes

perimenting with direct-seeding techniques which, if successful, will eliminate in some sections of the country the time and heavy expense of growing seedlings in nurseries and transplanting them to permanent sites.

It is not because we lack enterprise. In a nation that can turn out 20,000 automobiles a day, whose production capacity is geared to getting a job done no matter how big it is, the planting of ninety-three million acres to trees seems anything but formidable.

And certainly we do not lack money. In comparison with the billions of dollars we are spending to rehabilitate depleted countries throughout the world, the additional billions we would spend at home for social reforms and public works, the few millions necessary to restore these idle lands to productivity seem insignificant.

But there's more to it than that. Money invested wisely in tree planting can be good business if the planted areas are properly managed. This is evidenced by the increasing number of landowners who are planting idle acres, by the growing importance the forest industries place upon reclaiming their cutover and poorly stocked areas with new trees.

And particularly is tree planting good business for the taxpayer. If carried out on a significant scale, the restoration of wasteful, unproductive lands will not only create new wealth for the nation but will vastly hasten the balancing of its forest budget.

Why, then, do we stand at the threshold instead of surging through the door with blueprints and tools in hand?

One plausible answer, perhaps, is that, up until recently, forestry has been more or less in a state of single-

purpose shock. Of necessity the pattern over the years has been to do one thing at a time—and in some instances it has become chronic. For example, few large-scale forestry undertakings succeed without adequate fire protection—but to center efforts on protection at the expense of a well-balanced overall program, including planting, is not the kind of land management that will balance our resource budget. Yet a surprising number of management and administrative agencies still function on this basis.

Another plausible answer is the lack of coordination in tree planting activities. Up until 1947, when The American Forestry Association, on the basis of its fact-finding survey of forest conditions, proposed a definite program for American forestry, little had been done to organize and promote collectively the nation's tree

In rugged country, hand planting is still the formula. But direct seeding, if proven practical, may change even that

Photo by AFPI



planting potential. As a start, the Association recommended the planting of not less than twenty million acres in twelve years, and suggested steps toward this accomplishment.

Still another answer is the smoke-screen of confusion that has settled over federal, state and private responsibilities and activities in meeting the nation's tree planting needs. The problems here are complex indeed, the result mainly of varying patterns of cooperation between government and landowners.

To sense the situation it is necessary only to run through a partial list of federal agencies which have a finger in the tree planting pie: the Forest Service, Extension Service, Soil Conservation Service and Production Marketing Administration of the Department of Agriculture; the Fish and Wildlife Service and the

Bureau of Land Management of the Interior Department; and the Tennessee Valley Authority. Tied into this pattern through the Clarke-McNary and Norris-Doxey acts are state forestry agencies and landowners.

The federal government's part in the present planting effort is two-pronged—first, the responsibility of keeping federal lands productive and, second, assistance to landowners. Under the Clarke-McNary pattern, the government, through the Forest Service, is authorized by Congress to give financial aid up to \$100,000 a year to the states to grow and distribute trees to farmers at low cost. Non-farm lands are not included in this pattern. The Soil Conservation Service and the Tennessee Valley Authority, on the other hand, deal direct with landowners—and trees are provided free. There are other varying

factors in this government-state-landowner relationship, all of which speak for a clarifying of policy and coordination.

For the state's part, they are spending nine dollars plus to every dollar Uncle Sam puts up for Clarke-McNary assistance. Indeed, many do considerably better than this. Pennsylvania, for example, in 1947 spent twenty-six dollars to the government's one.

There are some who believe the states should shoulder their own tree planting responsibilities, the federal government confining its activity to public lands. Others—and this is the position taken by The American Forestry Association—feel that federal appropriations under the Clarke-McNary pattern should be greatly increased, with the state and landowners sharing equally in the overall costs. Furthermore, it is felt that assistance should be extended to landowners other than farmers.

The Forest Service supports this pattern. Its thinking favors increasing Clarke-McNary appropriations to \$2,000,000 a year, to be matched by \$2,000,000 from the states and \$2,000,000 from landowners, both farmers and non-farmers (through the purchase of trees). This would make available for planting on privately-owned lands a billion trees a year, or enough to reforest a million acres.

But even this thinking falls short of The American Forestry Association's program of one and two-thirds million acres a year. At its planting rate, forty-two years would be required to restore the seventy-three million acres of worthless denuded land, an additional twelve years for the marginal farm lands. One and a half billion young trees would be planted every year.

Thus we are not without blueprints for planting America. But it is obvious that under the existing federal-aid pattern, the machinery cannot turn until Congress and the states, on a matching basis, provide the required funds. There are numerous bills before Congress now (see "Washington Lookout," page 30), which would increase Clarke-McNary authorization for this purpose to \$1,000,000 by June 1950, and to \$2,500,000 by 1953. This larger figure would make possible the planting scale proposed by the Association.

Against the background of an overall federal budget of \$42,000,000, this small investment of public funds—around two cents per capita—in America's land future would seem beyond debate. Yet for lack of

Curtailed during the war, state nursery production has hit the comeback trail due to an unprecedented demand for trees

Louisiana Forestry Commission



This forest industries nursery at Nisqually, Washington, will turn out 8,000,000 seedlings this year for the Pacific Northwest

K. S. Brown





Louisiana Forestry Commission

THIS WAS ONCE A FOREST—Sometimes it was fire—sometimes it was cut-out-and-get-out. The result was the same, millions of acres of scorched or stripped land going to pot. But these lands can be reclaimed by planting trees, and there are signs they will be. The pine plantation shown below, in Wisconsin, is one such sign. Future forest harvests depend largely on more of the same

George Lehr, AFPI



it, millions of acres of barren land, which might otherwise be growing vigorous young forests, today scar the countryside, a tragic waste of a potentially valuable resource.

Let's look at the record. During the twenty-year period ending in 1946, and including all types of forest land, this country successfully planted only an average of 190,000 acres a year, or 3,800,000 for the entire period. At this rate, approximately 400 years would be required to stock the seventy-three million acres in need of planting.

The American Forestry Association's program would reduce this time to forty-two years.

The years 1947 and 1948 were even less productive due to shortages of planting stock, the result mainly of curtailed nursery activities during the war.

But these two years were marked by a significant development. Public demand for trees reached unprecedented heights. And the demand continues, with the states struggling, not always successfully, to keep abreast of it. From a total output of sixty-three million trees in 1945, nurseries throughout the country increased production to 160 million trees in 1948, and estimates for 1949 range from 300 million to 370 million.

This doubling of production in the short span of twelve months, with only slight increase in federal assis-

tance, reflects a new and commendable determination on the part of the states to meet their responsibilities in planting America.

At the same time, nurseries operated by the forest industries stepped up their output. The Nisqually nursery in the Pacific Northwest, for example, will have eight million seedlings ready for distribution this year.

Federally operated nurseries for the most part are not affected by this rising tide of interest in tree planting, as production is controlled by planting schedules on public lands. The exception here, of course, are nurseries operated by the Soil Conservation Service and the Tennessee Valley Authority, which produce mainly for landowner demands. However, when and if Congress decides it is a good investment in America's future to reclaim for timber production six million acres of national forest land, the federal nursery capacity will be wholly inadequate.

But it is well to keep in mind that two-thirds of all forest land in the country is in private ownership. Furthermore, that four million owners of small forest properties, mostly farmers, control fifty-seven percent of our commercial forests. Thus, from a timber production standpoint, the future of these lands is of far greater concern to the American people than that of public lands already under sound management.

Four million acres of national forest land need replanting for timber production. Here is a beginning in Wisconsin

Lee Prater, USFS



And while tree planting is not the most vital problem in these small woodlands—bringing existing forests under better management has higher priority—the blight of nearly forty million acres of unproductive deforested land is serious enough to the nation's economy to warrant drastic action.

Recent reports from state foresters and other sources estimate the planting job on farms and small forest properties as follows:

Illinois and New York, 3,000,000 acres or more.

Georgia, Indiana and Pennsylvania, from 2,000,000 to 3,000,000 acres.

Alabama, Florida, Kentucky, Michigan, Minnesota, Mississippi, South Carolina and Tennessee from 1,000,000 to 2,000,000 acres.

Arkansas, Iowa, Kansas, Louisiana, Nebraska, North Carolina, North Dakota, Ohio, South Dakota and Washington from 500,000 to 1,000,000 acres.

California, Colorado, Connecticut, Idaho, Maine, Maryland, Massachusetts, Missouri, New Hampshire, New Jersey, Oklahoma, Oregon, Texas, Vermont, Virginia, West Virginia, Wisconsin and Wyoming from 100,000 to 500,000 acres.

And under 100,000 acres, Arizona, Delaware, Montana, New Mexico, Rhode Island and Utah.

The remaining plantable areas are spread out on federal lands, on lands owned by states, by counties, by municipalities, on lands owned by lumber and pulp companies, mining companies, water and power companies, the railroads and others.

It's a major operation, this job of planting America—and it should be dealt with as such.

And it's an operation we must get on with. We've been standing at the threshold too long, gambling with tomorrow's forest products needs.

There are problems, of course, but the longer we wait the more complex they become.

Coordination of programs can be shaped by cooperative action on a national scale. Confusion and conflicting policies can and must be remedied. The problem of money? That is for Congress. Any one of the bills now before that body, if enacted, and funds made available, will set in motion the machinery needed for planting America.

And they are bills our legislators can concentrate on without fear of the people back home not liking it. The people of the country are definitely in the mood to plant America.



How To Plant A Tree

Applicable to Any Coniferous Variety

Photos by Devereux Butcher



1 Waste no time getting trees in the ground after arrival from the nursery. A good root system is the first essential to successful planting, and roots dry out rapidly



2 Trees should be "heeled in" if not planted immediately. Dig an open trench and slant one side. Place the trees in layers on that side and keep wet. Tamp soil around roots



3 On the day of planting, keep tree roots damp with wet moss or by dipping in a puddle like this one. Never let the roots be exposed to the sun or wind, even for an hour



4 A good tool for planting by hand is an ordinary mattock. One stroke should make a hole big enough for the roots of a two-year-old seedling to spread out. Roots need room



5 Now set the tree in the hole as deep as it was in the nursery, as shown by the collar mark on its stem. See that the roots are well spread out, and then fill in with loose dirt



6 Lastly, pack dirt firmly around the tree with the heel or toe of the shoe, so that it will stand upright. From here on it will shift for itself if given reasonable care and protection

Twilight for Wildlife?

It all depends, says this eminent authority, on the pattern of land use we follow, particularly in agricultural areas

By IRA N. GABRIELSON

President, Wildlife Management Institute

MANY students of the problem are convinced that some forms of wildlife are facing the greatest crisis since the white man arrived in North America. This crisis is due entirely to human activity. Many now believe that man's industrial and agricultural development of this country has become a geological force affecting wildlife and wildlife habitat in vast areas as much if not more than natural factors.

The white man found here a virgin continent. Indians were few in number. They lived directly by hunting and fishing and had little if any more

effect upon the abundance or scarcity of other forms of life than any other predator. They prospered or failed to prosper as other life did, and all were tied into a community in which biological and physical factors directly affected both man and beast.

In a few hundred years the white man has changed this picture—first by his increase in numbers from a few straggling colonies to a nation of 148 million people. There is a well-known biological axiom that the total life that can be supported by any territory is limited. The amount of that life varies according to changing conditions. Therefore, the mere fact that additional millions of individuals occupy the land means that other living things must be relatively less abundant.

Also influencing the abundance of wildlife has been intensive use of land for agriculture as well as for cities, roads, manufacturing plants and other exclusive uses which man now makes of space formerly available for other creatures.

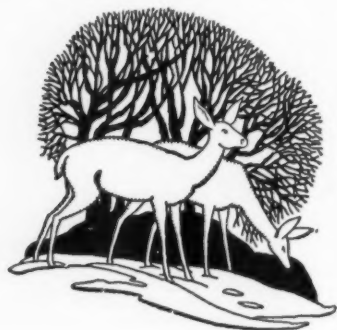
The first human activity which interfered with other creatures in the



Wide World Photos, Inc.

New World was killing for food and clothing. As long as this killing was not too severe, it acted more or less as a cropping system exactly as had Indian activities. But as populations increased, as guns and equipment became more effective, and as heavy traffic developed in furs and hides, killing began to affect total wildlife stocks. Thus hunting and fishing to feed and clothe greater populations, followed by a growing number of recreational hunters and fishermen, undoubtedly continue to have a great effect upon many living things.

Beginning with settlement on the Atlantic seaboard, the clearing of land for agricultural use had only local effect until human demands caused the clearing of vast areas of forest. When settlers reached the grasslands and land could be con-





CHOW CALL IN THE ROCKIES. An airborne chuck wagon in the form of a hay-laden C-47 stampeded this Colorado elk herd in January but the hay was most welcome. Deep snow in the West posed another wildlife problem this winter

verted to agricultural use by the breaking plow, the change in environment proceeded even more rapidly. Even if there had been no slaughter of the grassland herds of buffalo, deer, elk, or antelope, they were doomed by the destruction of their habitat. There was no place for them and eventually they would have vanished, though perhaps somewhat more slowly than before the guns of the insatiable market hunters.

Drainage did not seriously affect wildlife until the supply of good free land decreased.

Drainage directly affects fish and aquatic mammals and birds which depend upon marsh and water habitat. It has a profound influence upon the numbers, the movements, and the distribution of waterfowl. It has af-

fected fishery resources and has been a major factor in the decreased abundance of valuable fur bearers, particularly the muskrat. Drainage, by lowering water tables and reducing storage facilities of the natural marshes, has an indirect effect upon wildlife as well as upon agricultural and industrial affairs.

Land drainage is not only of historic importance. Many such projects are still being promoted. A bill in the 80th Congress authorized the study of fifty-seven million acres in the Southeast to determine how much of it can be drained for agricultural use. One and a half million of these fifty-seven million acres include coastal marshes which are the last remaining East Coast wintering grounds for waterfowl.

As to the "dam mania" which is now sweeping the country—the building of great dams for power, irrigation, flood control, or navigation has reached such a peak as to have an important influence upon the relative abundance and distribution of living creatures. However good or bad these works may be, they do profoundly affect wildlife populations. They always disturb local biological patterns.

It is obvious that each big impoundment floods land that produced certain forms of life. It is not true, as many unthinkingly believe, that wildlife can be abundantly produced in wastelands. Wildlife is a product of soil and water. It can be produced only in meager amounts in unfertile lands or sterile waters. It can be pro-

(Turn to page 34)



Typical of the Colorado spruce belt is this scene on the White River Plateau

Mass Murder in the Spruce Belt

By ARTHUR H. CARHART

THE Four Corners Country lies northeast of the Grand Canyon—the only spot in the nation where four states have a common point of meeting. They are Arizona, Colorado, New Mexico and Utah. On June 19, 1939, a big wind was blowing out of that region, galloping northeasterly, rushing to storm the jagged peaks and pinnacles of the Colorado Rockies.

Up in the spruce belt, at elevations ranging from 9,000 to 11,000 feet, the forests of Engelmann spruce bent before the wind. Great brace roots of many spruces loosened in the friable layer of open soil spread thinly over hard granite. Then roots tore out, and over went acres of old evergreens, crashing, falling, tangling.

As they tipped, the big trees retained roots in the soil on the side to which they fell. They remained alive in many instances, but their vitality was lowered.

There were a number of such big

“blow-downs” up in the spruce belt. Foresters reckoned some of the timber might be salvaged. Other areas were too inaccessible. And that was that.

But that wasn't that. There just

Beetle larvae devour bark of spruce



weren't enough woodpeckers. Too much wind—too few woodpeckers. And it has added up to one of the worst unpredictable catastrophies to blast Colorado's forests since records began. What followed in ten years has killed more trees of merchantable size in the one state of Colorado, than all the forest fires in the Rocky Mountain region killed in thirty years. Not just merely *more* trees killed, but *sixteen times as many* in terms of board feet.

It wasn't the blow-downs as such that caused the loss of this vast amount of timber, now figured at over four billion board feet. It was the way these trees became incubator areas for a little, blackish beetle, about a quarter of an inch long, by the name of *Dendroctonus engelmanni*.

This little insect, about the size of a house fly, is a normal resident of the spruce belt of the Rockies. Foresters have known of his existence

Too much wind—too few woodpeckers! That's the story behind the disastrous beetle invasion which doomed millions of valuable Engelmann spruce in western Colorado

there for a long time. Although there had been spots where this beetle did appreciable damage in years far past, no major outbreak of serious size has occurred within the memory of living men. There was no record of *D. engelmanni* going on a rampage—so nobody was alerted to what might happen.

These beetles work in pairs. At early-summer mating time, the female enters the bark of an Engelmann spruce, boring into the soft inner bark. The male follows her. They tunnel vertically, parallel to the grain of the wood. No major damage is done at this period.

Little side pockets are bored out from the vertical tunnel and in these the female lays her eggs. Altogether about 125 eggs are thus deposited by each female, and when in from three to four weeks they hatch into the larvae the spruce tree host is headed for trouble.

The larvae, which are little grub-like fellows about the size of a rice grain, don't bore vertically. They tunnel laterally around the tree, cutting across the cambium, thus girdling it. These grubs progress to the pupal stage the next spring, hatch into mature beetles in June and July, but quite generally remain at the host tree for the ensuing winter. The second year they pair off, mate, take flight, find a tree, and the cycle begins again.

The girdling of the tree by multiple little tunnels bored by the beetle larvae certainly would kill a spruce if no other attack were made. But the beetles have an ally that hastens the tree's death. As they enter the tree, the insects carry with them the spores of a fungus that starts shuttling its microscopic threads of death through the sapwood just beneath the bark.

The thready structure of the fungus clogs the avenues through which sap flows. The wood becomes blue. Death of the tree is hastened and the value of the lumber that might be cut if it were salvaged is decreased. A "beetle tree" is doubly doomed because of the introduction of this fungus by invading insects.

Natural controls hold the beetles in check during normal conditions. When they attack a healthy tree there always is some check through sap flow killing them in one of their several stages. Severe weather may throw a check against them. Above

all, the woodpeckers reduce their numbers. It is estimated that these industrious birds may seek out and eat as much as forty-five to ninety-eight per cent of any one season's brood.

There are six species of these feathered beetle controllers that come to the aid of an infested spruce tree. Three of them are year-around residents of the high mountain country, and some of their most effective control occurs in the winter when other foods are not so abundant.

The two most effective are the alpine three-toed woodpecker and the Rocky Mountain hairy woodpecker. These fellows, with their barbed tongues, dig into the bark and rasp out the beetles and larvae in vast numbers.

When the blow-down areas were tangled close to the ground, the weakened trees became the bonanza resi-

dence of beetles. They prefer a tree that can't fight back; one mature and not flowing sap so lustily as a young tree, or one pulled down in vitality through some other cause. Along with this, another factor entered. The down trees were covered by heavy winter snows.

That blanket of snow, protective and moist, blocked a winter freeze killing the beetles and the larvae. In addition, it prevented the industrious little woodpeckers from doing their good turn. Thus, the populations of beetles in the big blow-downs began to pyramid. There was no indication at first that something unusual was happening. The stock was quietly building up until it was ready to explode.

The winters passed. Then calamity in the form of a small black bug began winging through the forests—

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The skeleton of a large Engelmann spruce—killed by the deadly bark beetle—stands in stark contrast to the healthy trees surrounding it

Jay Higgins, USFS



PARK of PEACE

By ISABELLE F. STORY



How two North American Nations, separated by a boundary line almost as imaginary as the Equator, have developed practical international neighborliness by establishing adjacent parks

"ONE more step forward from the actions of our brave ancestors at Runnymede."

The words were those of Joseph M. Dixon when, in 1932, as First Assistant Secretary of the Interior, he represented the United States Government at the dedication of the Waterton-Glacier International Peace Park, a superb wilderness area lying partly in Alberta, Canada, and partly in Montana; and freely available to the peoples of the two countries.

The interesting genesis of this peace park has implications much more far-reaching than Canadian-United States amity, important though that be. Its establishment, seventeen years ago, celebrated the more than a century of peace between two great neighboring nations in the Western Hemisphere.

Back in the drab days of 1931, the Rotarians of Montana and Alberta were holding their first joint annual meeting. The scene was Canada's Waterton Lakes Park, which joins our Glacier National Park on the international boundary. The prime purpose of the Rotarians, men from the Main Streets of many western towns, was to promote fellowship between the businessmen of Montana and Alberta.

Meeting in this sublimely scenic region, practical idealism grew apace. Such scenery should belong to mankind, without national restrictions. Then, too, the delegates realized from their own experience many of the practical factors inherent in the friendly relations between the two countries. So they conceived the idea of establishing an international peace park, composed of Waterton Lakes Park and Glacier National Park, to celebrate the ties of friendship between the two countries.

The idea struck fire, Rotary International supported the project, and less than a year later, at the second annual meeting of the Rotary Clubs of Montana and Alberta, held in Glacier National Park, the Waterton-Glacier International Peace Park was dedicated. This accomplishment involved passage of legislation by the Parliament of the Dominion of Canada and

the Congress of the United States.

Following the enactment of such legislation, the President of the United States signed a proclamation establishing the international peace park, "to permanently commemorate the long-existing relationship of peace and good will existing between the peoples and the Governments of the United States and Canada," as crystallized into law by an act of the Congress of the United States and "by Royal assent of the Canadian Government." At dedication ceremonies in June, 1932, the following message from the President was read:

"The dedication of the Waterton-Glacier International Peace Park is a further gesture of the good will that has so long blessed our relations with our Canadian neighbors, and I am gratified by the hope and the faith that it will forever be an appropriate symbol of permanent peace and friendship."

It is significant that such an international park can be established and can function as such, while at the same time each of its sections continues to retain its individuality, nationality, and separate administrative rights. While each park continues to be administered and financed separately by its respective government, from the standpoint of use and recreation the two parks are one great mountain park, available alike to the peoples of the two countries.

Visitors to one section may readily go to the other on foot, by horseback, by boat, or in automobiles. The less strenuously inclined may visit both parks by a cooperative arrangement between the motorbus lines serving Glacier National Park and the Canadian national parks. Official government telephone lines from the United States side of the international peace park tie into the office of the superintendent of Waterton Lakes Park; and the U. S. National Park Service's short wave radio system in Glacier has a station in the Canadian area.

In matters of fire protection and control, the relations between the officials of the two sections are on a basis comparable to that existing in this country between the National Park Service and the Forest Service where national parks adjoin national forests.

The most remarkable single feature (Turn to page 32)

Markers by the road divide Glacier and Waterton parks



Photos by T. J. Hileman

Above is beautiful St. Mary's Lake in Glacier National Park, the United States section of this international peace park. Below is a view of Waterton Lake from the lobby of the famous Prince of Wales Hotel in Waterton Lakes Park on the Canadian side. Peoples of the two countries freely enjoy this scenery and use recreational facilities





Forests in Ferment

A United Nations forestry expert continues his tour of the Orient, reporting on conditions in turbulent Siam and China

By M. A. HUBERMAN

Part II

SIAM produces enough rice to load down many of the chopsticks of Asia. It is even shaped something like a bowl with forested slopes surrounding the irrigated flat paddy land. And Siamese foresters and agricultural technicians are fully aware of the close tie-up between the trees on the hills and the water in the rice paddies.

My forester guide laughed as he explained that when he traveled in the United States people seemed surprised to learn that Siam had a forestry organization; they had heard only of Siamese twins and Siamese cats. However, he showed me teak plantations, teak logging, working

plans, the forestry school at Prae, lac factories, sawmills, and the government Forest Service headquarters.

The Siamese forestry technicians know what they want to do, and when the ferment of repeated government changes simmers down, perhaps they can proceed with putting into effect recommendations of the FAO (Food and Agriculture Organization of the United Nations) Siam Mission to strengthen all phases of forestry and forest utilization activities.

Visiting the logging concessions

and log storage yards of several foreign-owned teak companies, I found that one, under Danish ownership, had a staff of three Danish and two Siamese trained foresters. These men not only mapped the logging areas and measured growth rates, but also carried on experiments jointly with government foresters to learn how best to get young teak trees to start again after logging.

Looking ahead, this company has developed management plans for a number of working cycles for its concessions on certain national forest reserves. The government foresters welcome such a progressive policy.

Not all foreign-owned teak compa-

nies, however, were as forward-looking as the Danish company. Few of the others had foresters on their staffs. Some even put pressure on government foresters to relax cutting girth limits and de-emphasize the conservation requirements in the concession grants. It is this situation which is causing the Siamese to consider possible government logging operations. They are also closely watching the progress of the teak-nationalization program of neighboring Burma.

This is part of the yeast at the source of the ferment in forestry in this part of Asia. There have been, of course, similar situations elsewhere in the world. The continued disregard by a few private companies of the need for replacing cutover forests with young trees has, on various occasions, aroused governments to take action.

In some countries this action has been along educational lines; in a few it has taken the form of legislative compulsory measures; in others, a combination of education, government assistance, with compulsion as a last resort. In some countries the action has necessitated large-scale government reforestation measures; in others nationalization of the industry.

But also there have been examples of governments failing to act in time to save the forest, the water, or the soil. Siam's neighbor to the north, China, is one example. Here past deforestation has resulted in mass murder of whole villages by drowning in repeated floods, by starvation when rice fields were buried under silt, and by spreading destruction through dust storms.

In Asia, particularly, this relationship between forests, soil, water and people's lives cannot and must not be forgotten. With the densely concentrated population increasing rapidly, impending disasters of flood, famine and death, which on other continents are things of the future, in Asia mean life or death today! And this is one of the main reasons foresters in Siam, China and in the rest of Asia are anxious for the ferment to finish.

Of course, Siamese foresters believe the ferment will subside before long, but they are not at all averse to helping things along. As an ex-



ample, we visited a wrinkled yellow-robed Buddhist priest and found him in conversation with an old Danish forester, long a resident in Siam. We learned that the priest had entered the novitiate at the same time the forester had arrived to take charge of teak operations forty years earlier. These two old men were recalling the time when the forester, faced with the problem of theft of teak logs during the river drives, had come to the priest for advice.

The teak concessionaire could have cracked down on the villagers through the police. But instead, the forester enlisted the aid of the young priest to persuade certain suspected individuals of the evils of theft. Both admitted they had been surprised at the effectiveness of this teaching. A few, but only a few, had to be persuaded by sterner measures. The forester and priest had remained friends all through the years, and the teak company had been more than happy to contribute to the building of pagodas and support of schools.

During our visit the question was raised whether or not it would be possible to try teaching in the temples of Siam the need for conservation, the evils of shifting cultivation with its periodic clearing and burning of forests, and to arouse interest in better farming practices.

The priest was definitely interested. He pointed out with a chuckle that if farmers were more prosperous they would support the priesthood more satisfactorily, and so he was sure his

superiors would seriously consider the idea.

Siamese foresters are trying to promote the modernization of forest products industries. Take the shellac industry, for example. The flakes of clear brown lac (basis for shellac) start inside a little scale insect, called *Carteria lacca*. The bug deposits a reddish brown sticky stuff on the twigs of ficus trees of the fig family. This hardens into stick-lac which is gathered, ground up in hand mortars or in mechanical grinders, screened, washed and dried in the sun.

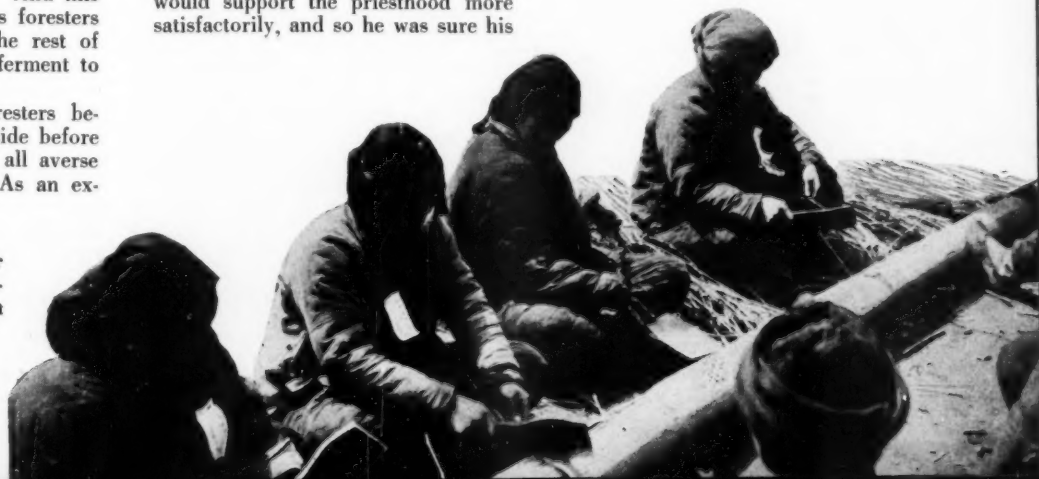
The red-brown powder is then poured into hand-sewn cloth tubes which resemble long sausages. These are held over open flames of wood fires to melt the lac. One end of the sausage is tied to a peg, the other twisted to force the melted lac through the cloth in a heap on a smooth flat stone.

When this heap is about the size and shape of a small sofa pillow, two little girls pick it up, knead it and punch it on the floor. After it has reached the proper consistency, they hold the bottom edge on the floor with their toes and stretch the upper edge as high as their arms can reach. Other girls then help stretch it out lengthwise until it looks like a sheet of brown cellophane. This sheet is hardened and dried on racks before it is broken into flakes for shipment. The United States is among the largest users of shellac, especially for phonograph records.

The foresters pointed out that quality grades depend on uniformity of thickness, color and freedom from impurities in the flakes. They showed me a more modern plant where steam heated vats replaced the cloth sausage—but the kneading, punching and stretching were still done by hand.

They also showed me how the larvae of the insect are cultured and placed in the trees artificially to improve quality and increase yield. Considerable study has gone into im-

Preparing willow slips for planting on soil erosion control and fuelwood project



proving the industry, but much more remains to be done.

Another effort at modernization is in teak logging. Some of the more progressive operators are trying out tractors on dry logging tracts in place of the traditional elephants. One operator told us that he estimated his mechanized fleet of four tractors, six Army trucks and one bright blue jeep moved at least five times the volume of teak logs as had his crew of elephants.

He stated, however, that some places were too wet for tractors, that better roads must be bulldozed through the jungle for his trucks, and that gasoline, oil and replacement parts were difficult to obtain.

But he felt the day would come when these difficulties would be less formidable. As Siam improved the quality and stepped up the volume of her teak exports, he believed, more and more foreign exchange would be available to buy machinery to modernize his country's wood-using industries. The Siamese foresters shared his optimism.

All through Siam and in many parts of Burma, sawmills were being operated by Chinese owners. This was also true in French Indo-China, Malaya, Indonesia and the Philippines. In view of their wide experience in the wood-using industries in southeast Asia, and because of the

urgent need for lumber at home, it seemed doubly disappointing that China's native timber supplies were inadequate to feed any considerable sawmill industry.

One of the first things I saw in Canton was a line of coolies carrying pine fuelwood on bamboo shoulder packs. Trotting from junks on the Pearl River to firewood yards, they lowered their bundles onto platform scales where one man carefully manipulated the weights while a bespectacled bookkeeper recorded the result.

I wondered if this meticulous weighing took into account the moisture content of the wood. What was to prevent the seller on the junk from dipping each bundle into the river before loading the coolies? And wouldn't the yardman lose money when, after drying the pine sticks, he sold them by the pound or ounce?

Jokingly, I put these questions to a Chinese forester, and he admitted that these and many other tricks-of-the-trade were practiced. He also asserted that the yardman's spread between his buying and selling price was more than enough to absorb all the moisture in the wood, in the humid atmosphere of Canton and even the dipped-up water of the Pearl River. In most villages, wood is so scarce the people cut grass on the hills to burn as cooking fuel.

The high regard in which wood is held in China was further impressed upon me as I watched the consummation of the sale of a raft of fir logs on a branch of the Yangtze River. On the shore the buyer and seller, each in felt hat and blue high-necked gown, walked slowly along as their respective staffs worked their way from one end of the raft to the other.

Eight men were on the raft—two with pike poles, two with tape measures, two with tally hooks and two with paint buckets and brushes. They weren't content to estimate the number of logs, the average length and girth, as would be done in most countries. No, the staffs of buyer and seller had to turn each log over and measure its length and circumference, tally the measurements and paint on it the dimensions and quality class.

Despite a frequently expressed desire to see logging operations, officials in Canton, Nanking and Peiping assured me that Communists and bandits lurked everywhere. Consequently, the best that could be arranged during my month in China were short trips to White Cloud Mountain near Canton, Purple and Green mountains near Nanking, and the Western Hills in the vicinity of Peiping. All were of interest because of pre-war and current programs of nursery production and plantation establishment, as well as experimental work in direct seeding.

As we traveled to these reforestation projects, road blocks and military patrols were everywhere in evidence. Developments since my visit seem to indicate that higher-up officials who curtailed by exploratory efforts were very well informed.

Considerable effort by national government forestry organizations, forestry schools, provincial forestry staffs, memorial commissions and research organizations has been put into establishing pine and fir plantations. Unfortunately, such efforts have had to be repeated over and over again because protection of established plantations has been inadequate.

Soldiers stationed near plantations have been in the habit of cutting down even the smallest trees to cook their rice or to keep warm. During the Japanese occupation, such planted trees may have been the only available fuelwood. In some provinces local governors have enforced their rulings against such trespass; but in most localities little official notice is taken.

In many places women or children

(Turn to page 40)

Erosion in northwest China, resulting from deforestation—a grim reminder of the age-old story of unwise land use seen in many parts of the Far East



The Adventures of JUNIOR RAINDROP

The U. S. Forest Service packs a lot of conservation into seven minutes in this lively film on "Junior's" visit to Mother Earth

WHEN Junior Raindrop is hurled from the lap of Papa Cloud by a bolt of lightning and tumbles to Mother Earth, the little shaver promptly gets into a pack of trouble. Of course, it could have all been averted, as the new U. S. Forest Service film short that chronicles Junior's troubles points out. If he had only alighted in a velvety meadow or a lush forest! But no. Junior hit kerplunk in as desolate, barren, unproductive a patch of terra firma as you ever saw.

Consequently, Junior never had a chance to go leap-frogging over clover clumps in a meadow or swing from leaf to leaf in a forest. He started skidding around in that unproductive soil instead. And like all naturally good children who are neglected by their parents, Junior started going bad. He joined a gang of other raindrops and became the toughest raindrop of all. Soon his erosion and flash flood operations made him a very dangerous character. And all because he didn't get a good start in life.

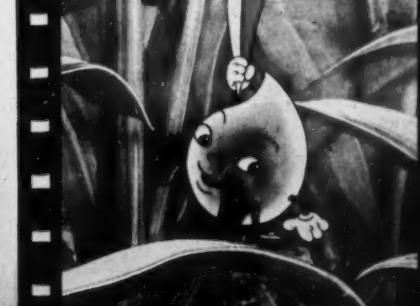
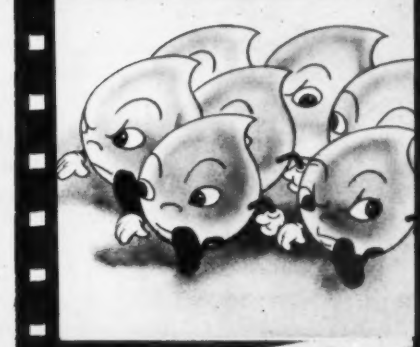
The moral in Junior's unhappy experience is that we, as custodians of Mother Earth, should accelerate our efforts to improve the old lady so that Junior's billions of brothers and sisters, who haven't got here yet, will develop into good citizens when they do come.

The panels at right are from the film sequences with the last one showing all the fun Junior could have had if he had been fortunate enough to land in the right type of environment.

The story is the work of Mrs. Ethel Kamm. Rudolph Wendelin and Seymour Payne developed 5,000 frames of animation and "live scenes."

The film is available for distribution under its full name, "Junior Raindrop"—16 mm., sound, at all Regional Offices of the U. S. Forest Service.

MARCH, 1949





Outdoorsmen in the Making

"Baptiste" points out a secret of the great outdoors to one of his students on a trek through the Dartmouth forest

What "Baptiste" MacKenney doesn't know about woodlore isn't worth knowing. He has taught many a Dartmouth youth a code of decent outdoor living and sportsmanship in the college forest

By ROBERT O. BEATTY

S PRAWLED across the granite hills of northern New Hampshire is the twenty-six-thousand-acre Dartmouth College Grant. Bounded on the east by the Maine border and the Magalloway River, it is a densely forested land of spruce, hemlock, white pine and fir. Although yielding well over a million dollars' worth of timber since granted to the college by the state in 1830, it is still one of the most ruggedly beautiful and wild areas in all New England.

Bear, bobcat, deer, beaver, otter, ruffed grouse, snowshoe hare, and even an occasional moose are found within its borders. Winding through the forest are the Dead Diamond and Swift Diamond rivers which, with

their roving tributaries, are alive with trout. A few logging trails, decayed pine stumps three and four feet thick, rotting logs up to 150 feet long, a surveyor's mark labelled 1832 carved into the trunk of a gnarled beech—these are sufficient evidences of the size and age of this wild country. Today, nature is boss here, and fishing, hunting, and outdoor living the business.

In this magnificent outdoor laboratory and playground, many a college freshman has stalked his first deer, learned how to build a lean-to in the snow, set a snare, handle an ax, or a flyrod. The student members of Bait and Bullet, a subsidiary of the famed Dartmouth Outing Club, are custodians of a newly erected cabin on

the area, built out of native timber with their own hands. The cabin serves as a weekend headquarters for young deer and grouse hunters, and trout fishermen.

Under the direction of C. Ross MacKenney, affectionately known as "Baptiste," these young men, many of them familiar only with city sights and sounds, learn a code of decent outdoor living and sportsmanship second to none and equip themselves to take their rightful places in the ranks of conservation-minded American sportsmen.

MacKenney is on the college staff as outdoor technician to the Dartmouth Outing Club, a highfalutin title which makes a lot of people

smile before they get to know him. He is a woodsman of no little renown in the north country. Raised in Maine in the tough logging era of the early 1900's, he later became a well-known guide and ultimately president of the Maine Guide's Association whose members constitute perhaps the most unique and experienced group of professional woodsmen, hunters, and fishermen in these United States.

Ross can fashion a packboard of ash starting with the standing tree, his only tool an ax. He can tie trout and salmon flies *par excellence*, construct just about every type of wild animal snare and trap set known to man and build a warm, comfortable camp in six feet of snow when the mercury is crowding twenty below. He bakes the finest dutch-oven cornbread in the world over a wood fire. Indeed, he performs with ease and

How would you dispose of garbage and cans while camping in the forest or along streams?

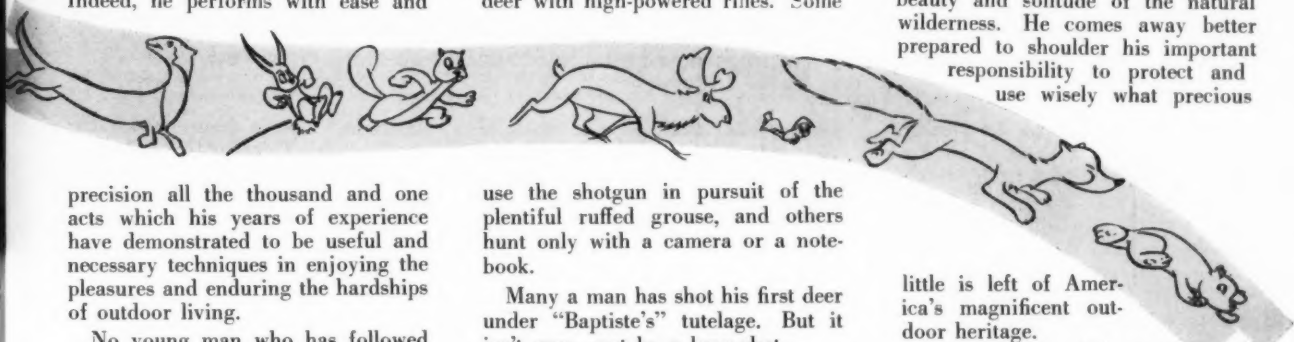
What kinds of trees found in the natural forest make the best firewood?

There are many more, of course, covering every conceivable aspect of outdoor activity. These are just samples taken at random from the final examination. A young man who passes that test is as well-equipped to take care of himself in the woods as the average sportsman who has been fishing and hunting for twenty years.

Weekends during the hunting and fishing seasons, the Peaks Camp, so called for its proximity to the Diamond Peaks towering above it, is usually occupied by eight to a dozen young woodsmen and "Baptiste." Some of the boys go in for bow and arrow hunting. Others hunt only for deer with high-powered rifles. Some

four hours (and often much less) he goes out and brings one in. Some of the boys swear he has once staked out from the previous summer, and many a skeptical fellow has lost a box of cartridges or the price of a new fly line in the process of acquiring an everlasting respect for the old woodsman. Before they get through, they're all pretty well convinced that C. Ross MacKenney is no amateur!

Such are the experiences which make a man self-reliant in his everyday dealings with his fellows. Outdoor living is a great leveler. It makes no difference if a man is the scion of a wealthy family or the son of a drugstore clerk. The only thing that counts is his willingness to give and take and put his shoulder to the wheel with his companions. Before he's through, a man learns something of the ways of the wild and of the beauty and solitude of the natural wilderness. He comes away better prepared to shoulder his important responsibility to protect and use wisely what precious



precision all the thousand and one acts which his years of experience have demonstrated to be useful and necessary techniques in enjoying the pleasures and enduring the hardships of outdoor living.

No young man who has followed "Baptiste's" guidance need ever fear or excuse his ability to take care of himself in the woods, or to obtain the fullest enjoyment and satisfaction from hunting and fishing and handling himself as a sportsman should.

Every boy is eligible for the position of New Hampshire junior guide and most of them try out for it, although not too many make it. There is no "book larnin'" in the requirements for this office. Under "Baptiste's" guidance, every candidate must learn by actual experience the *how* and *why* of what it takes to be a woodsman. Before he gets through, a boy must be able not only to explain, but also to demonstrate the answers to such questions as:

How should a canoe be loaded facing upstream in fast water?

What methods are there for preparing a minnow for a trolling bait?

In rain, how do you prepare a dry camp and sleep on the ground without getting wet?

What kinds of shelters can you make from materials found in the forest?

use the shotgun in pursuit of the plentiful ruffed grouse, and others hunt only with a camera or a notebook.

Many a man has shot his first deer under "Baptiste's" tutelage. But it isn't easy—not by a long shot.

"Baptiste" always waits until the last weekend of the season to shoot his deer. Then, on a designated morning within the space of three to

little is left of America's magnificent outdoor heritage.

Ask any man who's gone through it. Few would trade the experience for all the juke-boxes, feather beds, cream-colored convertibles, and *pâté de foie gras* in the world!

Care of good equipment is not overlooked, though the archers have it easy





We Make A Sauna

By J. A. COPE

Ever take a Finnish steam bath? It requires a bit of doing, but it is well worth it, says the author, who describes how he built a sauna in up-state New York

EVER since I had the pleasure of taking a "sauna," or Finnish steam bath, on a farm in Finland, the urge has been strong to build a sauna at my own forest camp in up-state New York.

The sauna is peculiarly Finnish—and every farm in that delightful country has one. Even the cities have great steaming rooms, where seats are built in tiers, as in a stadium. The novice sits in the lower, cooler seats, the seasoned bather in the top tiers.

In contemplating our sauna, we knew the house would be easy since any airtight building would serve the purpose, but the stove—that was another matter. Just any old chunk stove would not do. It had to be specially constructed so it would contain at least a bushel of fist-sized cobblestones.

Finally my search took me to a Finnish community south of Ithaca where I had heard a Finnish blacksmith was making sauna stoves out of old oil drums. Well, he was—but it seemed he had so many orders ahead that it would be years before I could get mine. Then, by good fortune, I stumbled onto a Finnish farmer in the same community who had become tired of waiting for his stove and had ordered one from a manufacturer in Michigan.

No time was lost in getting the address and suggestions about size and capacity so that an order could be placed for immediate delivery. In anticipation of the stove's arrival (it came in August), I had early that

spring felled and peeled a bunch of eight-inch popple trees and stacked the logs up in an open crib under shade so they would not check in seasoning.

The cabin, we figured, would heave and settle as a unit, since it would all be spiked together. That meant no digging down below frost line for footings or foundations as had been the case when we built our lodge, and also the huge outdoor fireplace. All we had to do was level a spot under the spruce and lay down a floor of "Caroline pancakes"—our pet name for those segmented shales that everywhere abound in the glaciated soils of the Allegheny plateau. That floor has now gone through two winters and the door to the sauna opens and shuts readily at all seasons of the year.

Once the floor was laid and tamped in place with a heavy joist, came the question of sauna dimensions. To be on the safe side, the floor had been made eight feet square, but a cabin six and a half feet square, inside dimensions, seemed ample for our purposes. The number we would have sharing in this ceremony at any one time would be limited. As a matter of fact, six people have bathed, or rather steamed, at one time within our sauna.

The bottom layer of logs resting securely on the pancake floor was first given a thorough soaking in Permatox against inroads of decay. Then, on successive Saturdays, the walls rose apace until we had them

seven feet high in front and six feet in the rear. This one-foot pitch has proved ample for such a small building.

There were, of course, no windows, which speeded up construction on the three side walls. We did concede a window in the door. This is quite unnecessary, however, for any light needed during the bath is best supplied by a flashlight of a little larger capacity than the usual two-battery affair.

After the roof was on came the job of thoroughly soaking the interior walls and the ceiling with Permatox. For this, a knapsack sprayer proved most helpful. The logs were sprayed on the outside, too. Popple is the least durable of woods, and protection from decay is essential for long life.

The job of making the sauna airtight was long and painstaking, and yet most necessary. If the steam can escape, the temperature is lowered and the effectiveness of the bath is diminished.

First, the cracks between logs were packed with oakum. A six-inch piece of hardwood about an inch wide and tapering to a very blunt edge was used as a caulking tool. Because of its larger head, a mallet was superior to a hammer for driving the oakum home tightly. Then to make tightness doubly sure, all cracks and joints were covered with a caulking compound.

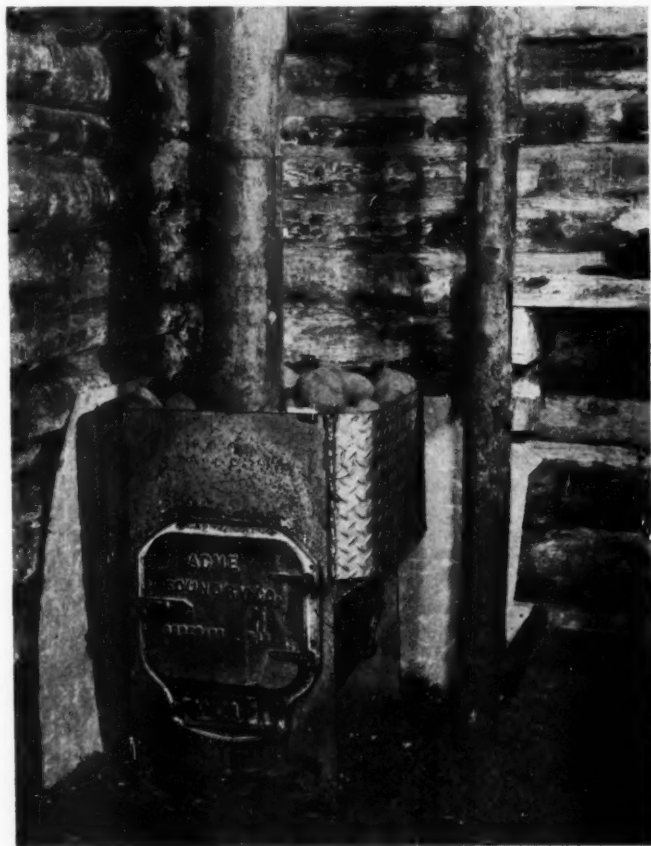
Next came the benches for the
(Turn to page 38)



Segmented shales are fitted and tamped into place with a heavy joist to make the cabin floor. The ground must be level. The peeled popple logs in the background will be used for the walls



The cabin is finished, and the door is invitingly open for you to step inside for a sauna. Dimensions inside are six and one half feet square, large enough for six people to steam at one time



Here is the sauna stove with its maw full of cobblestones. The stones must be of igneous rock and uniformly round and smooth. Thoroughly heated, they spit and hiss when sprinkled with water



Cold water—forty degrees—is poured into the milk can for the shower to close your pores. After the steam bath, they say, you don't mind it. In winter the Finns roll in snow

Why A Shade Tree Service

By ERNST J. SCHREINER

Because of the response to my article "Do We Need A Shade Tree Service?" which appeared in the July, 1947 issue of *AMERICAN FORESTS*, I have been asked by the editor to further discuss our shade tree needs. Reader reaction, as might be expected, was multifarious; but in this second article I shall try merely to satisfy the request for an outline, without burdensome technical details, of shade tree research needs in specific fields.

Some readers thought I had presented a one-sided picture; requested, almost insisted, that I present the other side. But what is the other side? That our present knowledge of shade trees and its distribution amply meets our needs? That further research on the planting and care of shade trees is unnecessary?

Dr. P. P. Pirone, one of the country's shade tree experts, made the following statement at a regional meeting of the National Shade Tree Conference in 1944:

"After nearly seven consecutive years of frequent observations involving hundreds of ailing trees around New Jersey and New York, the best I can claim is a fifty-percent batting average on correct diagnoses, and this fifty percent includes trees where additional observations and much laboratory work went along with it".

This statement does not imply that fifty percent were cured. Unfortunately, correct diagnosis alone cannot cure a sick tree, and for many correctly diagnosed ailments there still is no cure. Furthermore, practical treatment results can be misleading because sick trees, particularly those suffering from an environmental disturbance, often die slowly; they may linger on for years without any treatment at all. In this case, even worthless treatments appear to prolong life.

As stated in the first article, it is my opinion that we have a widely scattered mass of partially digested and inadequately correlated information about shade trees, that what we know is far from sufficient, and that we still need to know much more.

In July, 1947, Dr. Schreiner wrote an article for *American Forests* advocating establishment of a national shade tree service to co-ordinate shade tree research in the United States. Response to the article was lively. Some flatly opposed the idea. More requested additional information—specifically an outline of shade tree research needs in various fields.

Dr. Schreiner's current article is his reply to these requests. To lick the shade tree problem he advocates aggressive and co-ordinated attacks along six research fronts. These attacks, he thinks, can be pressed most vigorously by a national shade tree service.

Dr. Schreiner, an authority on tree selection and breeding, has been engaged in basic tree research since 1924.

—The Editor

Other readers were interested in the organization of a shade tree service, how it would function, where it would be located and how it could be financed. There was considerable objection to adding another arm, or even a finger, to the activities of the federal government. In this article I shall not attempt to answer these questions other than to state that a governmental shade tree service is not the only or necessarily the best solution.

A few readers questioned the economic justification for expanded shade tree research. Since shade trees have long been a part of our way of life, shade tree research probably can be considered to have sociological implications. Ask any home owner who has a fine shade tree on his lawn whether or not he considers the tree essential to his comfort. If he isn't sure tell him—preferably by phone—that his shade tree must be removed.

Even industry now realizes the value of shade trees and beautiful grounds around the industrial plant. They may not be essential, but it is becoming more and more evident that they improve morale—and consequently production. The fact that

more and more progressive industries are spending money to plant and maintain shade trees and ornamentals indicates their growing importance to our economy.

The September 15, 1947, issue of *The American Nurseryman* carried the following statement: "The shade tree industry is starting to call itself a \$100,000,000 business. That may well be a modest estimate. Shade trees themselves are worth many times this figure; elms alone are estimated in value at \$200,000,000."

And don't forget that even a dead shade tree has a price tag. When street trees die in great numbers, as the elms in the East and in some of the Central States, the cost of removal is a public liability that runs into millions of dollars.

If the elms alone are worth \$200,000,000, how much are all our living shade trees worth? Half a billion dollars? A billion? Two billion? I don't know; but the values are huge enough to merit greatly expanded research.

We Need Fundamental Research—In the previous article I mentioned the urgent need for fundamental research on the growth and development of trees—answers to the questions: How does a tree grow and reproduce? What factors affect its growth and reproduction? How can these factors and their effects be accurately measured?

It is interesting, but hardly comforting, that in the United States inadequate basic research is not limited to shade trees. Late in 1947, the press quoted Dr. Karl P. Compton, the eminent scientist, as saying that "The field of nuclear science and atomic power is a good illustration, where, out of, say a dozen of the fundamental ideas, some nine or ten have come from Europe, including the original discoveries of radioactivity, or artificial transformation of chemical elements and of nuclear fission. . . . The one thing which we in America accomplish to a superlative degree is to develop the new ideas, from whatever source, into useful applications engineered in supe-

rior manner for production and use."

About the same time, Dr. Edward U. Condon, director of the National Bureau of Standards, was quoted in the press as follows: "As a nation we have been outstanding in applying science; we have not been outstanding in basic scientific discoveries or theory." And further, "Since the physical sciences have outstripped man's capacity for using them wisely, sanely, religiously, it is of the utmost urgency that we attempt to forge ahead in the humane sciences lest all be lost."

We Need Co-ordinated Research—Solution of our shade tree problems will require aggressive and co-ordinated efforts in six broad research fields: engineering, entomology, pathology, soil science, physiology and genetics (breeding and selection). And research in all six lines must be kept abreast; we cannot hope to achieve our goal by rapid advance in one, two, or even half of these fields.

For example, twenty years ago I worked out the life history of the fungus responsible for the very common *Valsa* canker of poplars, and found that this disease is fatal only to trees whose vigor has been seriously reduced by other factors. A diseased poplar can be cured if it can be

brought back into vigorous growth; if a cankered tree growing on a very poor soil is moved to a rich nursery site it will throw off the *Valsa* disease; a cankered forest tree, retarded in growth because of crowding, can be cured by cutting out the neighboring trees.

Yet time and again I have been unable to prescribe for poplars which were growing so poorly that they were slowly succumbing to *Valsa* canker. In most cases, I could only guess at the reason for their poor growth; in some instances fertilizer helped, in others, and apparently under similar conditions, it did not. Here, then, is an example where pathological research is well advanced; we know the organism, we know its life history, we know the cure is to increase the vigor of the tree. But we are far behind in our knowledge of how to keep the tree physiologically fit.

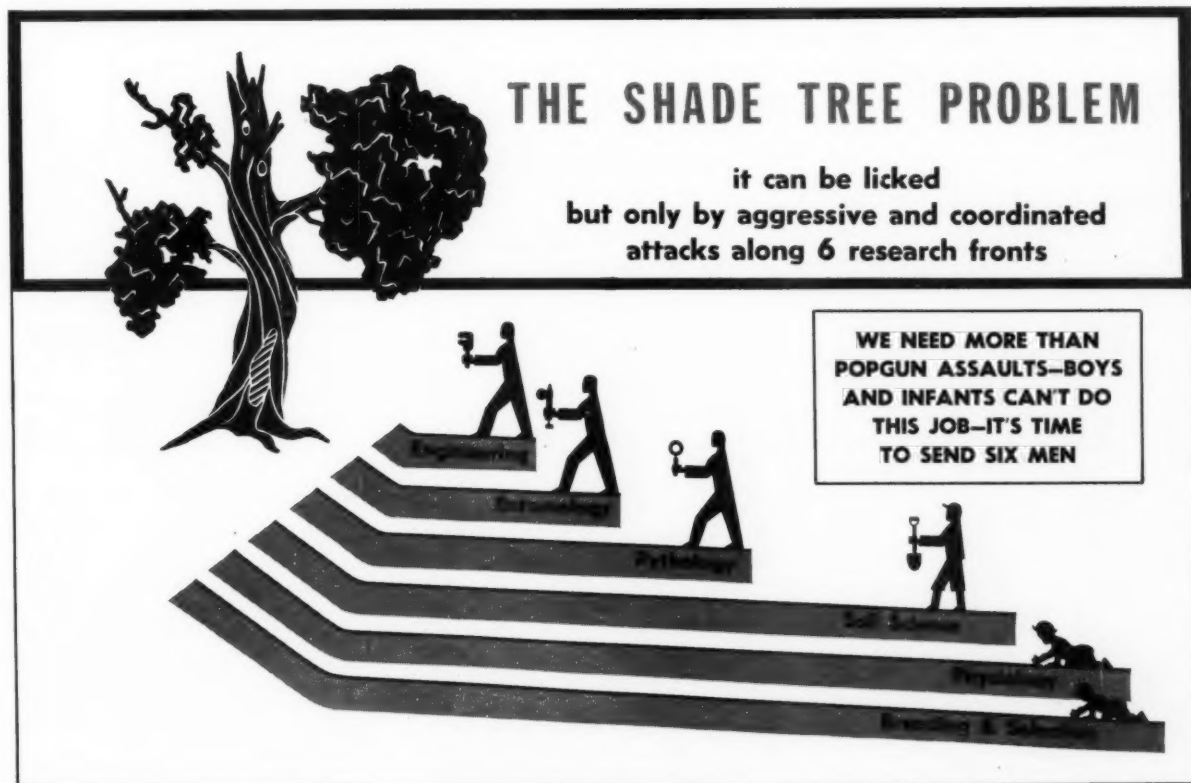
Present Status of Shade Tree Research—Shade tree research at present is definitely out of balance. For various reasons we have moved much more aggressively and rapidly in some fields than in others. The six broad fields of research do not present equally difficult problems, and they most certainly differ in the length of time required to obtain re-

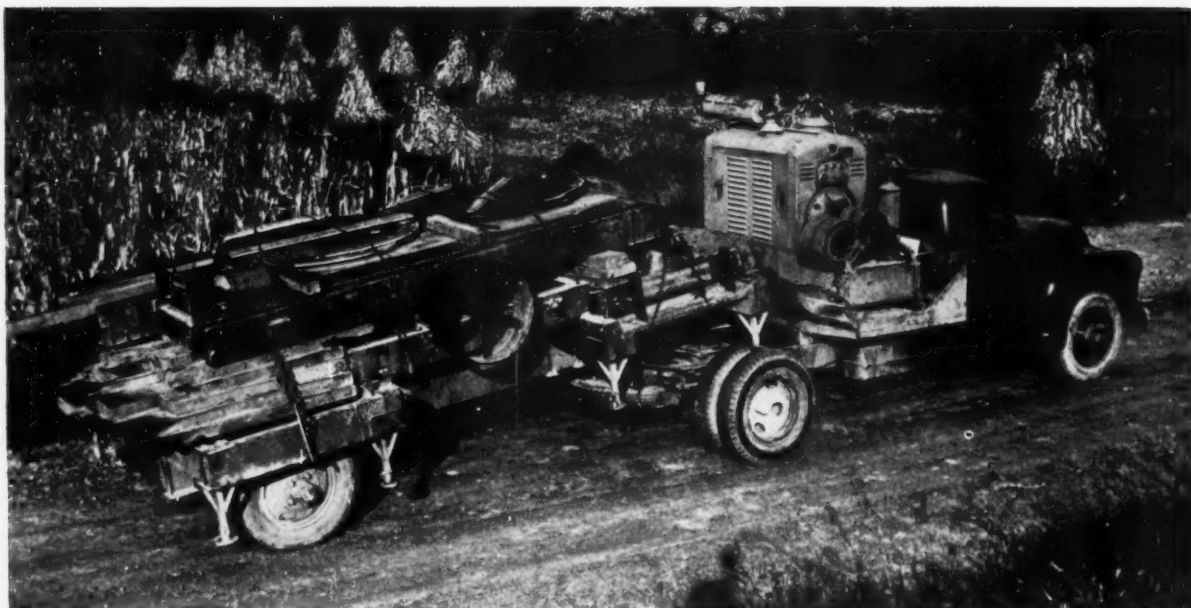
sults, and in the profitable marketability of the products of successful research.

It is impossible to put exact values on the difficulties of the research problems, the time required for their solution, the present status of our knowledge, and the manpower and money that has been and is presently being applied to research in each of these fields. For this reason, I have resorted to the chart on this page which should give a rough but fair picture of the relative status of shade tree research from the standpoint of time required for research results, progress to date, and extent of our present research effort.

Engineering Aspects—As used, the term "engineering aspects" includes all of the machinery and tools needed for the planting and maintenance of shade trees. Researchers on the engineering aspects of the problem probably have the easiest and certainly the shortest road to travel. Here we have made rapid progress; we have demonstrated our national aptitude for developing gadgets ranging from huge tree-movers, powerful sprayers and dusters, to power driven hand-chisels, and lightning rods for shade trees.

Advance in this field probably will
(Turn to page 43)





This mobile sawmill was built by the West Virginia Agricultural Experiment Station. It is undergoing field tests to gather data the Council will use

Task Force For Conservation

In two years the West Virginia Forest Council has put into action a hard-hitting campaign to break down the barriers thwarting a sound program of forest conservation. Cooperative approach is its secret

ANY one struggling with the cooperative approach to better land use would do well to visit West Virginia these days. There he would find an active, hard-hitting task force of conservationists which in the short span of two years has broken down many of the barriers obstructing the path to a sound program of forest conservation in the state. This force is the West Virginia Forest Council.

The primary objective of this aggressive group has been to obtain coordination of effort among all various conservation agencies and interests, and to convert an inherent regional jealousy into solidarity of purpose. Could there be a sounder approach toward hastening the day when West Virginia can begin to realize maximum benefits from its forests?

But judge for yourself how the council has fared since it rolled up its sleeves and waded into a do-or-die battle for conservation.

First, take note of the neat, newly

By NORT BASER

erected green and white signs proclaiming this and that forest tract as a "West Virginia Tree Farm." This is a project of the council in cooperation with American Forest Products Industries. To qualify for that sign the owner must present positive evidence of steps taken to improve his woodland.

Children are talking about the Arbor Day program their school is going to have in April. This too, is an activity revived by the West Virginia Forest Council. The governor helped by issuing an Arbor Day proclamation; then Harry Mosebrook, chairman of the council's education and information committee, and Carl Johnson, extension forester, prepared a booklet outlining a suggested program.

You become more impressed by the influence of this livewire committee when you learn it has been coop-

erating with the State Educational Department in developing a program of conservation teaching in schools.

You will not be in West Virginia very long before you hear about the conservation forums held at Martinsburg, at Keyser, or of those planned at other locations. You learn that their purpose is to get opinions from citizens on local forestry needs. Once again you learn the council, in cooperation with the Farm Bureau and State Chamber of Commerce, is planning and sponsoring the forums.

But the local people themselves decide what they want to discuss. At Keyser it was the water problem, and the courthouse was packed. At Martinsburg it was farm woodlot education and marketing. In the eleven forums planned there may be more than eleven topics discussed. The thinking is that if you are going to do something for the good of the people, it is nice to know what the people want.

At Elkins you might like to visit

AMERICAN FORESTS

the Mountain State Forest Research Center. Establishment of this federal agency resulted largely from efforts of the council's research committee. In its first year the center has put three full-time research men to work on four projects: silvicultural and economic studies on the Fernow Experimental Forest; prediction of growth by species, site and forest type; a study of relative costs of harvesting mine props under different degrees of cutting levels; and rehabilitation on strip mine areas.

Eight other projects are being considered for future action. In the meantime, the council has urged the importance of establishing research projects on watersheds. According to Dr. C. R. Orton, director of the Agricultural Experiment Station, West Virginia University, and an active council board member, the water supply problem is a major consideration where industrial expansion is contemplated. He asserts the problem was created by deforestation and can be cured only by reforestation.

It might be noted that the university is another of the many close cooperators with the council. Its division of forestry designed and constructed within the last year a mobile sawmill which is being used for field research, and recently added another full-time research worker and forest pathologist whose findings will be available to the council. Torkel Holsoe, professor of silviculture, has begun a project on "Management of Forest Land for Sustained-Yield Mine Timber Production," and a number of bulletins on research developments are being published.

The council influence is also becoming apparent in legislative chambers at the State Capitol in Charleston. Solons are weighing the opinions advanced by this organization which they have come to respect as the voice of a powerful cross-section of voters. At present, a bill is being considered to give assistance in forest management.

Latest task the council has tackled is to gather facts concerning forest resources, agencies, markets, needs and utilization so they may be dovetailed into a comprehensive master forestry program for the state.

The council has leaned heavily to these two points in its action program: stimulation of private initiative in all phases of forest land management; and protection and management of watersheds so that they will provide sufficient water for domestic and industrial uses, check floods and furnish sites for recrea-

tion. Other points given priority are:

Adequate protection and management of all forested lands; reforestation of non-productive lands best suited to growing trees; greater utilization of wood products; manufacture of more finished wood products and development of new secondary wood-using industries; and orderly marketing of forest products to sustain permanent wood-using industries.

That the council represents a grass roots movement is evident in its plan of organization and in the caliber of men from all walks of life who have rallied to help put into effect a hard-hitting conservation program on nine million acres of forest land, two-thirds of the state's entire area.

A mere babe in the woods in point of time, the council was conceived at Morgantown in May, 1946, was formally organized at Charlestown in June, 1947. Officially blessed by the governor, it has the people of West Virginia for its collective godfather.

Its membership represents all classes of landowners—from the farmer with but a few acres of woodland to the owner of thousands of acres—and it includes a representation of all agencies having forestry responsibilities in the state.

The membership elects thirty from its number to serve on the board of directors. Each of the following groups must have at least one representative: landowners with holdings of 50,000 acres or over; owners of

from 5,000 to 50,000 acres; owners in the 500 to 5,000-acre bracket; and owners of less than 500 acres.

The board in turn elects a chairman, vice-chairman, secretary and treasurer, plus a ten-man executive committee.

First chairman of the board is Walter C. Gumbel, conservationist for Monongahela Power Company, at Fairmont.

Council activities last year were carried out on an extremely limited budget. Careful planning made a little money stretch a long way—but the big job ahead is more costly.

Accordingly, the council's finance committee has set about to rectify matters. West Virginia industry has been canvassed for sufficient starting capital on which to operate. Some 150 big businesses, including chemical, glass, coal, lumber, steel and land companies, public utilities and railroads, have been asked to contribute a specific amount based on a proportionate share of potential benefits.

Eventually a large membership should develop from public interest.

Undoubtedly there are rocky days ahead for the council. But its members are a young group, willing to give and take to make theirs a better state. When men, coming as they do from so many spheres of special interest, can thrash out their differences and pull together for the betterment of forestry conservation their chances for success are good.

At dedication of the state's first tree farm in Beckley, this group took a look at West Virginia Forest Council plans. W. C. Gumbel (left) is chairman



WASHINGTON LOOKOUT

By A. G. HALL

Heading into socialism because of increasing dependence on the government—that is the danger to the farm economy, according to Kent Leavitt, president of the National Association of Soil Conservation Districts, and a director of The American Forestry Association. Speaking before a meeting of the Friends of the Land in St. Louis last month, Leavitt called for a new concept of farm ownership—a concept recognizing ownership as trusteeship, involving a new science of land use and application of that science to every acre in the country without changing our form of government.

Is forestry headed the same way? Should not Leavitt's principles of trusteeship be applied to forest land? Can the science of forest management be applied to every forest acre without changing our concept of government? And, can the United States weather the delay which must occur if the principle and science are to become established gradually through education and enlightened private ownership?

The answers as given by federal foresters are found in a report, "Forests and National Prosperity," USDA Miscellaneous Publication No. 668, just released by the U. S. Forest Service. It contains the overall findings of the Service's nation-wide forest reappraisal, which repeat that sawtimber supply is declining 50 percent faster than current annual growth, and furthermore that the quality is deteriorating. To meet long-range goals, the country should grow 18 to 20 billion cubic feet of wood fiber, including from 65 to 72 billion board feet of sawtimber annually. Current growth rates provide for 13 billion cubic feet of wood, 35 billion board feet of sawtimber. Several decades of good management are necessary, the report indicates, before the growth goal can be reached.

A three-point action program is proposed: (1) public aids to private forest landowners, especially small ones; (2) public control of cutting practices on private lands; and (3) expansion and intensified management of national forests.

Step one is well on its way. In a series of bills to amend the

Clarke-McNary Act of 1924, which provides for federal aid to the states on a matched-fund basis, for certain forestry activities, federal authorizations would be considerably increased. Purpose is to stimulate the states and assist them in fire control, reforestation, forestry education and on-the-ground assistance to landowners.

A typical bill and the one likely to receive action is H. R. 2296, introduced by Representative Granger of Utah. Similar bills have been introduced by Representatives Sikes of Florida, Lane of Massachusetts, Brehm of Ohio, Lind of Pennsylvania and Cotton of New Hampshire. Early hearings are anticipated. These measures would increase federal authorizations for forest fire control from the present level of \$9,000,000 annually to \$19,000,000 by 1954. Funds for the raising and distribution of tree seedlings would be raised from \$100,000 annually to \$2,500,000 by 1953. Extension foresters would receive for forestry educational work up to \$2,500,000 by 1953. And, for the employment of forest technicians to give on-the-ground assistance to woodland owners a top limit of \$6,000,000 would be authorized by 1953. Authorizations would be contingent upon state and private funds being spent for these purposes on a matching basis, except that extension work could be financed by the federal government to the extent of \$10,000 in any state without matching.

The bills also spell out the fields of activities in forestry of the Extension Service and the state foresters. Funds authorized under the bills for extension work would be confined solely to educational activities; state foresters would carry on the individual landowner assistance programs. Approved by legislative planners of the Land Grant College group, under whom Extension Service works in the various states, and by the Association of State Foresters, the measure stands a good chance of passing in the 81st Congress.

If the amendments are made and if the funds are appropriated there is a probability that adequate protection from fire will be extended to a good part of the around 100 million acres now without it, although much of the increase will be absorbed by

increased costs of protection. The additional funds for reforestation will make possible a reduction, in time, of the 70 to 90 million acres now denuded or poorly stocked. The increased education funds for extension work will help put thousands of small owners into action on their own lands and will pave the way for thousands more to be reached by forestry technicians with their on-the-ground assistance. It should also create an atmosphere of interest and demand for services which can be handled by private forestry consultants, particularly on the larger areas.

With all this increased emphasis on helping the states and private owners to solve their forestry problems, the question may well be asked, "Is step No. 2 in the Forest Service action program—public control of cutting practices—necessary?" And, will the federal foresters attempt to take Step No. 2 until they learn how far Step No. 1 will actually take them? Or will public regulation come about anyway as part of the apparent political trend?

As a partial answer, we note that the rumored forest regulation bill has not yet been introduced.

Step No. 3 will be implemented somewhat if the President's budget is approved. Additional funds are requested for timber sales administration, but much will be absorbed by rising costs. As for national forest land acquisition, the budget request is for \$643,000, the same amount as was appropriated last year.

The nation-wide survey conducted by the U. S. Forest Service has been moving ahead very slowly since it was authorized in 1928 by the McSweeney-McNary Forest Research Act. Initially the Congress authorized \$3,000,000 to make a comprehensive survey of the present and prospective requirements of timber and other forest products, of timber supplies, present and potential productivity of forest land. In 1944 the Congress increased the total authorization to \$6,500,000 with the proviso that not more than \$750,000 be appropriated annually. An additional \$250,000 was authorized on an annual basis for resurveys.

To speed up completion of the initial inventories, as well as meet mounting costs of operations, several bills have been introduced to increase appropriations. An example is Florida's Representative Sikes' H. R. 2001 which would increase the annual authorization to \$1,000,000 for initial inventories and provide \$1,500,000 a year to keep survey data current.

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Park of Peace

(From page 16)

ture of the Waterton-Glacier International Peace Park is the international boundary that it straddles. For nearly 4000 miles that boundary extends between the Atlantic and the Pacific oceans. Another 1500 or so miles, from the Portland Canal to the Arctic Ocean (sometimes called by geographers the Arctic Mediterranean), separate our territory of Alaska from Canada.

This whole boundary has been totally unfortified for more than 125 years. There are no armed forces on either side, the respective countries being represented at the border only by the law enforcement officers of the Customs, Immigration, and Border Patrol. All international waters along this boundary are open to free navigation by citizens of both countries.

Through the international peace park the boundary is indicated by a wide swath cut through the forest, on a standard sky-line width of twenty feet, this figure necessarily varying a bit as a result of topographical features or other local conditions. Such a swath marks the entire boundary where it passes through wooded areas—a total of approximately 1353 miles of boundary vista, 460 in Alaska and 893 along the United States border, according to the International Boundary Commission. The remainder lies along waterways such as the St. Lawrence River and the Great Lakes.

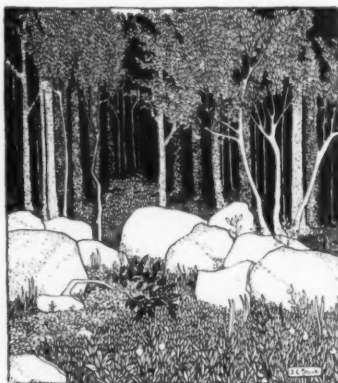
Not content to rest on their laurels as the moving spirit of the international peace park, Rotary International members in 1947 donated \$1500 for the erection of appropriate roadside markers where the boundary swath cuts through the Chief Mountain Highway, the main highway connecting the two sections of the peace park. These cairns were dedicated that same summer. Canon S. H. Middleton of Cardston, Alberta, tells that a thousand people—Rotarians, visitors, government officials—stood with hands clasped across the border and repeated the words:

"In the name of God we will not take up arms against each other. We will work for peace; maintain liberty; strive for freedom and demand equal opportunity for all mankind. May the long existing peace between our two nations stimulate other people to follow this example. We thank Thee, O God."

Of serious concern to those who brought about the establishment of this park, to conservationists general-

ly, and to national park officials in particular, has been the proposal to build a dam at Glacier View, in the Glacier National Park section of the international peace park, as part of the vast Columbia River flood control project.

Since another equally effective damsite exists beyond park boundaries, and no national emergency, economic or otherwise, dictates that the Glacier View site be developed for power or flood control, it would seem that no modification of the natural scene should be made within the international peace park. Not only would the proposed dam destroy for-



ever the approximately 20,000 acres of forest, streams, and lakes in one of the finest sections of Glacier National Park, but it would seriously reduce the already too-limited winter wildlife range.

Intrusion of such a dam into Glacier National Park, with its detrimental effects on the winter range of the park wildlife, would seem to be in contravention of the idea implicit in the cooperation of Canada and the United States in establishing the Waterton-Glacier International Peace Park. It is cheering that the Department of the Army has given assurance to the Department of the Interior that "every consideration" will be given the views of the latter department on the importance of preserving Glacier View.

Another international peace park along the same pattern, has been proposed for our southern boundary. The Big Bend National Park in Texas is in the triangular area enclosed by the big bend made by the Rio Grande on the Mexican border. When the Secretary of the Interior approved the Big Bend project, he suggested the establishment of an international

park, through the creation of a national park across the border by the Republic of Mexico, with legislation to implement the international peace park project.

The suggestions met with a warm response from the Government of Mexico, and joint surveys were made by the two governments and boundaries outlined. Big Bend National Park became an actuality in 1944, but so far Mexican authorities have not found it practicable to obtain the lands for the park on their side of the border, largely because of wartime interruption to the program. Mexico is still vitally interested in the project, however, and the idea of an international peace park there still flourishes.

Perhaps nearer to accomplishment is the establishment of the Coronado International Memorial, planned to commemorate the crossing of the Spanish conquistador Francisco Vasquez de Coronado, from Old Mexico into what is now the United States. Congress has authorized the establishment of the memorial, and a site of approximately 2800 acres adjoining the international boundary, about ten miles west of the town of Naco, has been selected for the United States portion.

Under the congressional legislation the President of the United States has authority to establish the memorial by proclamation when the Government of Mexico has established, or provided for the establishment of, an adjoining area of similar size south of the border. It is understood that a decree to establish the Mexican portion has been drafted and is pending in Mexico City. Issuance is contingent upon the settlement of certain land problems involved.

Although not a federal project, there is another exceedingly interesting international area on the Canadian-United States boundary. It is the International Peace Garden in North Dakota and Manitoba, within thirty miles of the geographic center of North America.

With the three nations on the North American Continent establishing international peace parks, peace gardens, and memorials, and building highways to facilitate travel from one country to the other, for pleasure or business (but not for the purpose of moving armies), a large segment of the modern world is actually practicing the much advocated concepts of brotherly love.

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Twilight for Wildlife?

(From page 13)

duced in abundance only in productive environment. Therefore, these projects may take the key areas without which wildlife cannot survive in numbers on the adjoining less fertile land.

Americans have reduced the productivity of soils at a greater rate than many other nations. These abused lands that can no longer produce agricultural crops produce poor crops of wildlife. America has vast areas which are, by natural processes, slowly growing back into productive condition. But today they are almost sterile as far as producing healthy, vigorous and abundant life is concerned.

It is the growing conviction of wildlife students that it is almost impossible to overemphasize the importance of good soil and water management from a wildlife standpoint. And while this nation has been careless in managing its soils, it has been even more so in the management of water.

Most water utilization projects are still developed as isolated units with little consideration for anything except the particular objective of the promoter, be it hydroelectric power, irrigation, flood control, or navigation. Big impoundments have been and are now being developed without much effort even to keep them useful as long as possible. No effort comparable with the original expenditure for impoundment has ever gone into preventing excessive erosion from silting up the reservoir.

This nation also still goes on the theory that streams should be open sewers into which any community or industry has an inherent right to dump waste material. Waters are only partially productive because of this practice. While a number of states have pollution laws, many are inadequate and others cannot be enforced because of the political strength of the polluters. The recently enacted federal pollution law has neither teeth nor the promise of development of teeth in its present form. Its best feature is that it indicates a growing public concern over this wasteful use of water.

Growing emphasis has been placed on the necessity for increased food production in recent years. Yet, the production of fish and other valuable natural prod-

ucts of many streams has been destroyed or greatly reduced by silt from excessive erosion, domestic sewage and industrial waste. Any one of these factors can destroy a stream; all three are almost certain to do so.

The propensity of man to look for easy and painless ways out of immediate predicaments also has profound effects upon other creatures. In agricultural lands, this search for a cure-all has taken the form of one fetish after another. Once a fetish was made of clean farming. It was made to appear almost immoral for a landowner to allow shrubs, bushes, trees, hedges to remain on the land. Reliance has been placed upon miracle crops, miracle fertilizers, and miracle chemicals to solve the problems caused by poor land use. The latest fetish is the assurance or belief of some chemists that a chemical cure can be developed that will in some magic way prevent all insect or disease damage.

Many new toxic materials such as DDT have direct and indirect effects upon wildlife. It is known that DDT used in heavy concentrations will kill birds. Used in weaker concentrations, it does not appear to be directly fatal to birds. However, it could easily have serious effects by destroying food supplies at critical periods such as the nesting season. There is some evidence that this does occur but the frequency of such occurrences is still a question.

Questions have been raised as to the necessity of the extensive use of insecticides and plant sprays if proper attention is paid to the maintenance of soil fertility. It seems obvious that fertile productive land will grow more vigorous crops better able to withstand diseases and attacks of insects than those growing on land of low fertility.

It is obvious that any human activity which changes the type of

vegetation on land will affect wildlife. Any human activity which puts land to intensive and exclusive use will also affect wildlife. In the latter case, the effect is always adverse; in the former, it may be adverse to some species and favorable to others, depending upon the new type of vegetation and the type of land management installed.

All these adverse effects could easily add up to make a very black picture. It would be black indeed, in fact rather late in the evening to be called "twilight" if there were no other factors to be considered. Fortunately for this country, there are.

The first and probably the most important is the growing public appreciation of the necessity of intelligent management of natural renewable resources. There is also a growing appreciation among leaders and the rank and file of conservation groups that the conservation and wise management of soils and waters and their plant and animal products are all part of one picture. It is not possible to promote one unit without some effect upon others.

Wildlife of forested lands has relatively brighter prospects than these forms found in purely agricultural lands. Wildlife management can be easily fitted into forest management, partly at least because man has not altered forest types so radically as to destroy essential habitat for most forest wildlife.

Much publicity has been given to "eruptions" of deer and other browsing and grazing animals. These eruptions have been caused by a complex of factors, one of which has been the "cut-out-and-get-out" logging policy.

Under such a system, vast areas were cut rapidly. Reforestation may have started immediately in such areas or they may have been held in a non-productive state for many years by recurring fires.

A forest recovering from fire or logging grows up to a mixed stand of shrubs and trees. During that period it produces a maximum amount of food and cover that favors the rapid increase of browsing species. As the forest grows and the overhead canopy closes, food and cover suitable for such animals decrease. Add to that natural cycle the concentrated ef-



fect of overbrowsing or overgrazing by too many animals for the conditions then existing and a "deer eruption" followed by starvation appears.

Sustained-yield harvesting of forests placed into actual operation will eventually help stabilize populations of such animals. Combined with an intelligent game management program, it is possible to foresee a long-range picture in which numbers will not grow to such peaks nor decline so violently. Not only browsing animals but many other forest inhabiting species will be benefited by sustained-yield harvesting. This segment of wildlife has prospects of better rather than poorer living environment.

The outlook for grassland wildlife is not so rosy. The antelope has made a comeback in many of the western states. To a less extent, it has recovered in the prairie states where once it was abundant, but its numbers are not and probably never will be large. The reason is obvious. Regardless of the fact that there is comparatively little direct competition between antelope and cattle for feed, intensive cattle grazing normally results in a decrease in the amount of other available food. Sheep grazing conflicts more directly with antelope grazing.

The complete grazing utilization of grasslands plus dry farming of many grassland areas adversely affects many other forms of wildlife. The prairie chicken and the sharp-tailed grouse, for example, have been extirpated from large areas by the destruction of necessary habitat as a result of changes in human utilization of land. Such forms can recover only in areas on which the original vegetation can be restored or some acceptable substitute provided. They do not have the necessary adaptability to persist in the face of the present type of land utilization and their places have, to some extent, been taken by such exotic species as ring-necked pheasants and Hungarian partridges, both better able to adjust themselves to present land use practices.

The prospect, therefore, for greatly increasing the grassland species is not as favorable as it is for forest lands. These species can and have been aided by some new practices and perhaps can be aided more by methods to be developed in the future.

Since agriculture has affected so many millions of acres of land, agricultural development has caused many of the major problems in maintaining wildlife populations. Many resident species can persist only to



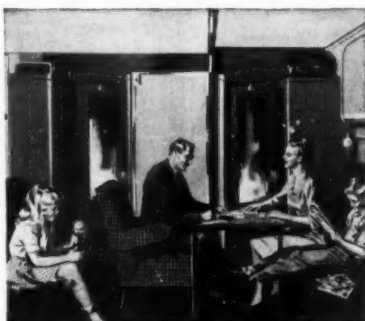
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the extent they can adapt themselves to present and future agricultural land uses. Changing from one farm crop to an alternate condition favors one form over another. In western irrigation districts, for example, a change from corn and alfalfa to sugar beets has been followed by a decrease in pheasant populations. Yet many resident creatures can persist under agricultural conditions, particularly when some attention is given to their needs.

Migratory forms of wildlife have perhaps been most adversely affected and face the darkest future. Something like 100 million acres of land, much of it either breeding, feeding, or wintering habitat for migratory waterfowl, have been drained in the past 100 years. Drainage for agricultural purposes is still being promoted extensively.

Until we more clearly recognize the values of marshes and lakes as water reservoirs and regulators of water tables, and the values of the products that can be taken from such habitat, and land management practices are developed to utilize such values, there is little hope for rebuilding migratory aquatic wildlife. Despite all other efforts, it is apt to continue on the decline as long as drainage of additional marshes and lakes continues.

If all past recommendations by agriculturists were made completely effective on an individual farm, it is

highly improbable that wildlife could or would persist on it. A combination of clean farming and intensive insect and weed control coupled with an effort to mine the last possible nickel out of every acre of available soil, would unquestionably destroy all food and cover for wildlife with the exception of such forms as the English sparrow, the starling, house rats and mice.

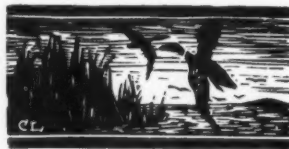
The saving factor is that there are interests and incentives other than securing the last ultimate nickel in profit that motivates much human activity. It is possible to practice profitable agriculture and sound soil management on land and still leave adequate food and cover for wildlife.

The use of permanent vegetation to prevent excessive erosion offers infinite possibilities for supplying adequate conditions under which wildlife may live without interference with sound land management. New techniques and new methods are continually being developed.

The assumption on which some of our land use recommendations are based, particularly in the U. S. Department of Agriculture, seems to be that this nation has grown so desperately poor that it must mine to the maximum extent every square inch of soil available. In thickly populated sections of Europe, there is still room for shrubbery, trees, hedges, and for wild creatures. In relatively thinly populated America, we apparently must urge the landowner to attempt to destroy everything that interferes with the maximum dollars and cents production of each unit of land.

There is too little appreciation of the fact that land can be profitably used for other purposes than the production of agricultural crops. Little attention has been given to the use of water farming although it is an important part of management in other nations. There is little appreciation of the values of marsh land and yet there are such lands whose net profit from management of the aquatic resources is greater than that secured on adjoining intensively cultivated agricultural land.

The fate of wildlife in agricultural areas is inextricably bound up with land use. To the extent that intelligent, long-range land management based primarily upon maintaining productivity can be translated from the field of theory into actual practices upon the land, wildlife will



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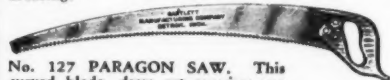


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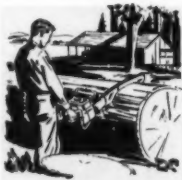
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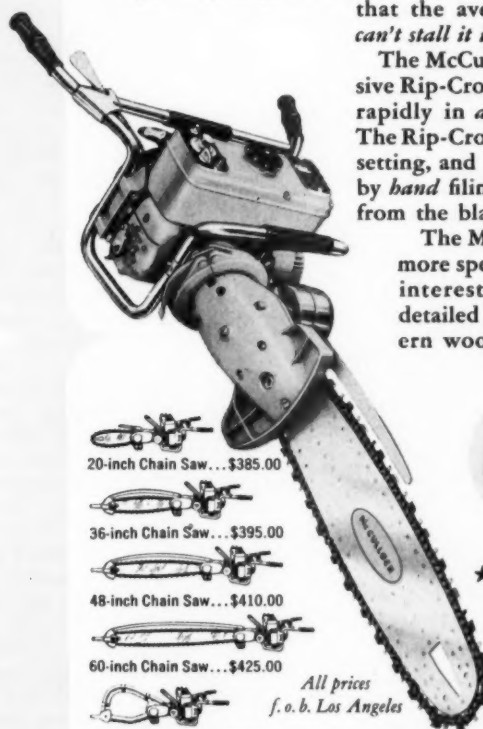
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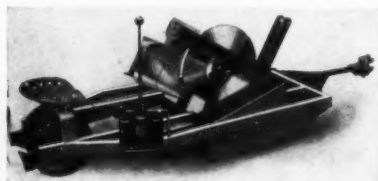
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benefit. Intensive agricultural, properly planned, can mean change rather than extirpation for wild creatures. Change in crops or in land use may affect some forms of life advantageously and others adversely. Nevertheless, agriculture does not necessarily mean twilight for wildlife. The

reverse may easily happen to the extent that intelligent management can be substituted for the exploitive type of land use still far too prevalent.

(This article is adapted from a paper presented on January 24 in the Department of Agriculture Lecture Series.—Editor.)

We Make a Sauna

(From page 24)

bathers. One about eighteen inches up from the floor for neophytes like myself was put along the right-hand side wall; the other about half way up the back wall allowed one to sit erect without bending the head.

Now we were ready for the stove. The end of all our labor and the beginning of fun was in sight. With great ceremony, the stove was moved inside onto its throne in the back left corner. The stones to fill its capacious topside maw had been a matter of much testing and search. We knew they must be of igneous rock, and a stream bed seemed the most likely place to find them uniformly smooth and round. A small tributary of the Susquehanna, thirty miles to the south, gave us an ample supply.

In taking a sauna, you use only a pint of water. This, with the help of heat and stones, will get you cleaner than a tub containing gallons of hot water. But extra water is needed. Once the pores are opened by the long steaming on the bench, they must be closed before clothes are donned. In winter, the Finns close the pores definitely and speedily by rolling in snow. For the rest of the year a cold shower must be provided.

For our purposes, we used an old milk can with a faucet and shower spray attached, placed high overhead on a platform between two spruce trees. A 100-foot well close by the sauna assured that our shower would be cold enough to close the pores.

The day finally came when we were to prove our sauna. An hour and thirty minutes was required to heat the stones so that they spit and hissed when sprinkled with water. For the heating, just three cubic feet of seasoned maple were required. That was pleasing, too, because it meant forty baths in prospect out of a standard cord of wood.

While the stones were heating there remained one important rite—"the making of a "vihta," a bunch of twigs with the leaves on, which the Finns use to gently flagellate themselves during the sauna ceremony. The Finns use birch, since that is their chief hardwood species. Beech

seemed to offer possibilities and we gave it a trial. Subsequently, a visiting forestry professor from Finland pronounced it superior to birch and suggested, laughingly that I go into the export business. About ten branch tips, fifteen inches long, compacted at the ends to make a handle an inch in diameter, proved satisfactory. To hold the twigs in the compact shape, the handle was bound with spruce rootlet. String would, of course, have been out of place. A basin of water for the face, and one for the sauna completed preparations. By this time, the thermometer hung on the wall not too far from the stove registered 105 degrees, Fahrenheit.

In Finland, I had asked my forestry friend the length of time a beginner should stay in the sauna. Fifteen minutes, it seemed, was about as long as novices could be expected to take it.

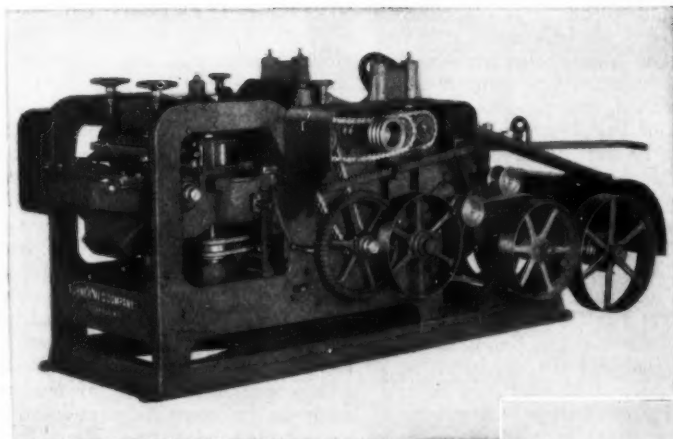
It is hard to describe the sensation one feels almost immediately after the first half cupful of water hits the stones. The water becomes live steam at once, rises to the ceiling and then settles down caressingly on your body. For a moment, you gasp for breath—then the sweat glands begin to operate. And why shouldn't they,—for with repeated conversion of water to steam the thermometer rises rapidly. When you stagger out at the end of the fifteen-minute period feeling completely dehydrated, the thermometer stands at 160 degrees—or higher. In the meantime, you have been gently flagellating yourself with the "Vihta" or dousing the face with handfuls of water lest it really burn up.

Then for the shower—no matter if the temperature of the well water is in the low forties. It just isn't felt at all. One understands why rolling in the snow has no terrors either.

It is interesting to note the time element in the resurgence of vigor through the body. In Finland fifteen years ago, it was almost synchronous with the rubdown following the cold shower. Now there is a time lapse of perhaps—five minutes—but it's worth waiting for.

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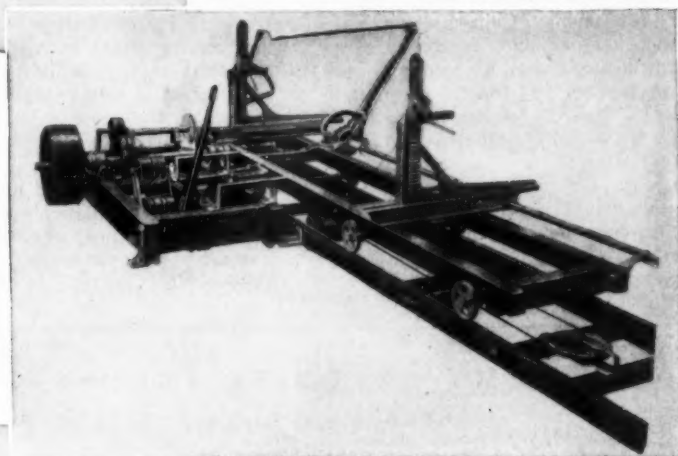


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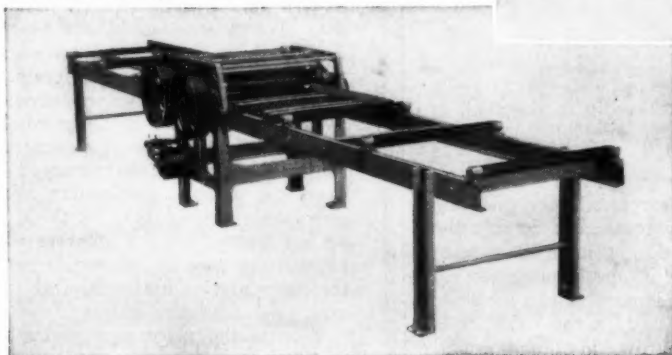
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Forests in Ferment

(From page 20)

cut the short twigs off small planted trees—not pruning the tree by cutting the branches off at the trunk, but shortening the branches, a sort of side pollarding. This is done, I learned, to stimulate branch-sprouting so a harvest of twigs may be taken each year for fuel.

The fact that this pollarding retards the growth of the entire tree and lengthens the time until it will be mature is not nearly as important as twigs for cooking supper tonight, here, now. In China, this pressure of people on land is expressed in many different ways.

Fortunately it increases the determination of Chinese foresters to continue with bigger and bigger nursery projects and reforestation undertakings. For example, Japanese troops deliberately burned off such beautiful plantations as White Cloud Mountain near Canton, on the pretext that the pine trees afforded protective cover for enemy Chinese guerrillas. Since V-J day, the Chinese have resumed production of seedlings and are planting them on the devastated slopes. Progress is slow, but patience is a virtue which westerners can learn from Asia.

With so many people crowded together on the land and every available cultivable patch needed for farm crops, it might be asked what space remains for planting trees.

Chinese foresters pointed out the same problem was faced in finding burial plots for their ancestors. Flat land which is suitable for rice or vegetables cannot be used for planting trees or bones of ancestors. So rocky slopes are used as burial grounds—and trees are planted on these grounds. There was objection at first, and some still recoil at the idea of their dead being entwined among the roots of little pine trees. But in general, the practice is accepted, and burial ground forests are now to be seen in many parts of southern China.

In quite another way the deaths of certain eminent Chinese have been responsible for important tree planting. Many memorial gardens and parks have been dedicated to the late great Dr. Sun Yat Sen. In his legacy of new principles for the Republic of China, he included the appreciation of forest conservation and wise land use. It is only fitting, therefore, that an important activity of these memorial gardens is the planting of trees raised in memorial nurseries.

One of the most outstanding of these is the Purple Mountain Memorial Park near Nan'king. Here an avenue of trees, guarded by pairs of carved stone animals, leads to the impressive building where Dr. Sun Yat Sen's sarcophagus is enshrined. Trained foresters are in charge of

the nursery and the plantations.

Fully as memorable were the plantings and direct-seeded slopes in the Western Hills out of Peiping.

Not far from the Summer Palace was one of the best arranged nurseries I visited anywhere in Asia. Walled terraces concealed underground irrigation ditches fed from a spring in a clump of trees on a steep slope; healthy pine and juniper seedlings in well-weeded beds were enclosed in cedar hedge windbreaks. Above the nursery were plantations.

Foresters of the Chinese Forestry Association outlined to me in Nan'king, over leisurely cups of tea, the forestry and timber utilization problems of their country. They were justly proud of the outstanding Chinese work in dendrology and systematic botany, but they recognized the great need for work in reforestation, soil conservation measures, flood control programs, adoption of modern methods in sawmilling and other wood-using industries. They have plenty of blueprints and plans for all sorts of projects.

What they need is financial support from their government to employ the forestry graduates from their seventeen universities. They need these trained technicians to carry on the work of the National Forestry Research Bureau, or in the forest planting and management programs of the National Forestry Department, both of the Ministry of Agriculture and Forestry. But here especially are the forests in ferment. So long as it has a civil war on its hands, the government finds it difficult to allocate even a fraction of the budget needed for a bare minimum of an agriculture and forestry program.

The fluctuating Chinese currency is perhaps the chief headache of the director of a forestry experimental station who has finally managed to obtain a pitifully inadequate allotment, only to find that by the time he has to pay off the laborers who planted the trees in his sample plots, the price of rice has multiplied several times.

Why is the price of rice important? Because his laborers will work only if paid in this commodity with which they can feed their families.

Faced with this kind of situation, how many of us westerners could be philosophical and smile graciously over a cup of tea as did the Chinese foresters while they patiently answered my many questions? And be-

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I'll take the oak—all oaks!

There is a sturdiness about all of them—all have a solid, substantial quality which I believe is unmatched in any other tree. As a garden tree they are unsurpassed—for one reason their tap roots go deep into the ground and do not, as in the case of the maple, elm, and poplar, take so much nourishment and moisture through the surface roots that it is difficult to grow anything around them.

As far as usefulness, the wood has always been important both in industry and for decorative purposes. Above all, the acorns furnish food for much of our wildlife and I believe in many cases for humans as well.

lieve it or not, these foresters were not discouraged. Or if they were, they did not let it creep into their conversation.

They know that China's millions of people in times past have faced adversity and sorrow. They feel sure, and I must admit they convinced me, that better days are coming; that this raging ferment of wrath will calm down.

When it does, the needs of the people for fuelwood will be met; plantations and natural forests will yield lumber and other forest products so that wood will not have to be weighed on scales; forest industries based on imported logs will be greatly expanded; research will be adequately supported; government programs in soil conservation, shelterbelts and flood control will make great progress; and there will be plenty of jobs for the university graduates in forestry.

(In the April issue Mr. Huberman moves on into French Indo-China, Malaya and Indonesia.)

Spruce Belt

(From page 15)

coming out of those big, natural incubator spots. They mated, tunneled, laid eggs, multiplied into a fabulous army of tree killers.

A tree that is attacked dies slowly. The larval grubs may have the spruce girdled, the fungus may be rampant, yet, to the casual observer, the evergreen, still lusty-looking, is in the prime. In the second year, the infested tree becomes sickly yellow, then brown. Then the needles fall, and the victim is left as bare as if swept by fire.

No one suspected such a calamity was in the making until early in 1942 when Wallace Pearce, one of the U. S. Forest Service staff working out of Denver, was blazing trees and marking them for a timber sale on the White River National Forest. He sliced off one blaze, and another, and then another. Then, feverishly, he began to slash and hack, tree after tree. Everywhere those trees were potentially dead, although not outwardly distressed. For the inner bark was laced with beetle tunnels until none could survive.

The news of impending disaster, already at or near the peak of explosive destruction, began to whip through the channels of communication between forest men. Field sur-

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veys made as swiftly as possible confirmed the discovery Pearce had made—that millions on millions of trees, over Colorado forests of the slopes westward from the continental divide, were doomed. The beetle enemy had sneaked up and taken over acres of green spruce forest. And it was too late to stop what was bound to happen. Indeed, the disaster already had happened.

Immediate plans were laid to salvage all possible bug-killed timber. For three or four years logs from beetle-killed trees can be sawed into lumber. After that, drying of the wood causes cracks. Then for another decade it is possible to utilize the killed spruce as pulpwood.

Many obstacles appeared to hamper salvage. Funds for building even the most temporary access roads to dead timber stands were not available. With four billion board feet of timber standing, waiting, deteriorating, there were not adequate mills in the area to handle more than a fraction of that volume of stumpage. No outside mill could be brought in to do the job in the two or three years' time during which the logs would make good lumber. Even if such milling facilities were set up, at the end of that period the volume of logs necessary to supply such a huge operation would abruptly end when the bug-killed trees were all harvested. The big mills that would have the capacity to saw the peak load then would lack adequate timber to keep them running.

With a pulp-hungry paper industry seeking new supplies, this looked like the greatest potential field of salvage. But the pulp mills now operating are far distant. Railroad freight rates made the shipping of logs from Colorado to Wisconsin or farther, wholly prohibitive. Efforts to get better rates, to achieve salvage, avoid waste, as a national service, met no success. Some pulp operators have considered establishing mills in Colorado, to salvage all possible bug-killed spruce, which has a top-rate fiber for pulp, and then continuing into future years by harvesting spruce from forest areas other than those now cursed with the blight of beetles. But this has not yet materialized.

A rough estimate shows that there is enough beetle-killed timber of saw-log size to supply lumber enough to build 400 thousand five-room frame houses. At the current distress level rates for stumpage in these infested

areas, the sale value would still build up to return \$8,000,000 if the timber could be sold.

The processing of the timber if it were harvested, would require twenty million working days. The final value of the products after processing, would run into a fabulous figure.

But because of the suddenness of what happened, because of the obstacles cited and many others, only some 100 million board feet of this distress timber has been cut. This is less than five percent of the total. Most of the four billion board feet of timber in the beetle-killed spruce will stand starkly, fall finally, rot eventually. If it doesn't, the challenge that lies there for our vaunted American ingenuity will have been accepted, and some ingenious and imaginative person will have found the way to prevent the terrific waste that seems inescapable.

The real concern of the foresters at the moment is the possibility that when the beetles have eaten themselves out of suitable spruce trees in the infested areas, they will take wing and become a cloud of destruction settling on other great stands of trees as yet not attacked. Just as with a forest fire, the right climatic conditions might spread the beetle "conflagration." And just as fire lines are thrown around a forest blaze, there are patrols and watchers all around the beetle areas on the alert to note any spread and to check it by all means available.

About twenty-five percent of the spruce forests in Colorado are dead as a result of this insect explosion. In one area, the first instance of its kind that has been discovered, the spruce beetles have turned on lodgepole pines as hosts. There still is potential greater calamity in the situation, but unless something unforeseen occurs, the "beetle fire" now will die down, "burn itself out," in the areas of great infestation.

Even though the peak of destruction is past, the conditions that spawned it no longer operative, what happened is one of the most dramatic, grievous and unpredictable current events in western national forests. From this experience the forest men may learn much in forestalling future epidemics of this type.

Perhaps a recurrence may be prevented. But in this case what has happened can be easily summed up in a few words.

There was just too much wind and too few woodpeckers.

Shade Tree Service

(From page 27)

continue to be rapid because the demand for tools and machines means an early profit from the successful products of such research. In fact, we are in some danger of getting ahead of ourselves. For example, we already have efficient mechanical devices to blow air, water and nutrients into the soil under ailing shade trees; but we still need basic research to determine when a tree really requires such treatment and exactly what and how much we should blow into the soil. And there is some reason to wonder whether we know enough to continue to control the ever increasing efficiency of our sprayers and dusters.

Entomology—Entomological research on shade trees has been decidedly advantaged by the tremendous amount of similar research on agricultural and fruit-tree crops. Research on insecticides never lacks industrial support because, here again, there is an immediate profit for the company which can develop a new or better product. The entomologist is also fortunate in that diagnosis of insect injury is relatively easy and rapid. Though there are exceptions, it is usually a simple matter to recognize insect infestation on shade trees, and relatively easy to identify the insect responsible.

Although we have come a long way in research on the control of shade tree insects, even this aspect is far from completed. There is need for research on insects that at present appear unimportant, such as presumably innocuous sucking insects, to determine their effect on the physiology of the tree and their possible relation to tree diseases. This will require close co-operation between entomologist, physiologist and pathologist.

And we need much more fundamental research on the biology and physiology of shade tree insects. An exact understanding of the physiology of our most important insects might radically change our present concepts on control. We need basic research to determine the factors that permit epidemics, and to understand the nature of immunity to insect attack. In selection tests of new hybrid poplars, it was found that hybrids derived from the same parent trees varied in susceptibility to Japanese beetle feeding during 1947, from extreme susceptibility to apparent immunity. It is probable that if we knew the basic reasons for this appar-

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Pathology—Shade tree pathology has also profited from extensive research on agricultural and orchard crops, particularly with respect to sprays and spraying equipment. But in the diagnosis of shade tree diseases and accurate identification of the causal organism, the pathologist usually is faced with a more difficult problem than the entomologist. Pathologists and entomologists often must work together, as in the case of the Dutch elm disease and practically all virus diseases.

Pathological research on shade trees has been marching along rather steadily, but we are still a long way from our goal. There are still many diseases that require intensive research, and more effort is needed to determine the extent and importance of virus diseases. For obvious reasons, diseases of the top of the tree have been studied most intensively; we need much more study on root diseases.

Such fundamental problems as the physiological interrelation between shade trees and disease organisms, and the relationship between the soil flora and fauna and the roots of trees, are receiving far too little attention. Here we need co-ordination of basic research in practically all fields.

Soil Science—The term "soil science" is intended to cover research on the physical, chemical and biological aspects of the root environment. There is a very serious and immediate need for fundamental research on the highly complex problems involved in the soil condition we so glibly call fertility. This is a difficult and highly complicated field of research, but relatively early results can be expected from closely co-ordinated efforts of soil chemists and biologists interested in the flora and fauna of the soil.

There has been considerable research on the effect of chemical fertilizers on shade trees, and this is likely to continue because the sale of specific fertilizer mixtures is a profitable business. We particularly need research on the role of organic material in the soil. Since a little bit in the right place and at the right time can result in astounding improvement in soil fertility, the importance of organic matter cannot be gaged

simply on the basis of its direct nutrient value. Its effect on plant growth probably must be measured in terms of biological change within the tree-root environment.

The final answers on the problems of soil fertility will require investigations combining chemical, physical and biological assays, based on the premise that soil as a medium for tree growth is not merely a static mixture of particles susceptible to chemical and physical definition, but actually a changeable, often delicately balanced environment.

Physiology—Plant physiology, briefly defined, is the study of the organic processes or functions of plants. According to a well-known textbook,

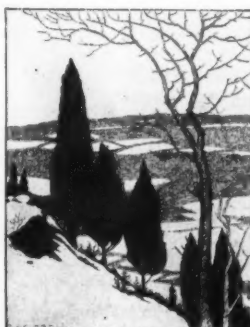
"The aim of plant physiology is to gain a complete and thorough knowledge of all the phenomena occurring in plants, to analyze the complex life processes so as to interpret them in terms of simpler ones and to reduce them finally to the principles of physics and chemistry."

Our general knowledge of plant physiology is far in advance of our

specific knowledge of the organic processes in shade trees. It is not sufficient to understand the general physiology of the tree; generalities can seldom be applied successfully to a diagnosis and treatment of individual ailing trees. We need basic physiological research on our important shade tree species, and particularly on the nutrition and water relations of these trees.

To quote Dr. Pirone again, from the *Arborist's News* for July, 1944: "How little we know about supplying nutrients to trees is quickly apparent to anyone who reads the printed literature on this subject. Confusion and contradiction are two terms which describe the situation rather well."

Among other things, we need physiological research on the specific action of growth promoting substances; on wound healing; on the nature of hardiness and resistance to inimical environmental conditions; on the interrelationship of disease and insect susceptibility and the physiological condition of the tree. And for most rapid progress toward the creation of better shade trees, we need more research on vegetative propagation, particularly from cuttings.



Breeding and Selection—This is the most time-consuming field of shade tree research. Selections and hybrids can be made and propagated in a relatively short span of years, but it takes many years to subject the selections to adequate and extensive field tests.

From a practical standpoint it can be said that until very recently almost nothing has been done in this field. In the past, botanists, nurserymen and arborists have made selections almost entirely on the basis of differences in appearance, such as habit of growth, leaf shape or leaf color, and so on. Such morphological or anatomical characteristics, though pleasing to the eye, are seldom if ever related to the ability of the tree to survive under difficult environmental conditions. Beauty of form or color is of little value if the tree will not thrive in a location where it is needed or desired. A few early selections were based on apparent resistance to disease, insects, or difficult environmental conditions, but until very recently there has been no attempt at large-scale selection on this basis.

The urgent need for better shade trees was stressed in my first article. Better shade trees can and must be obtained through selection and breeding. Hybrids resulting from controlled tree breeding have shown not only hybrid vigor, but resistance to diseases and insects as well. Disease resistant trees of several genera are already being propagated for extensive experimental trials. In addition, there is evidence that such a basic physiological characteristic as resistance to the inhibiting effect of grass on the early growth of trees, is also an inherent characteristic, and as such could be improved through breeding and selection.

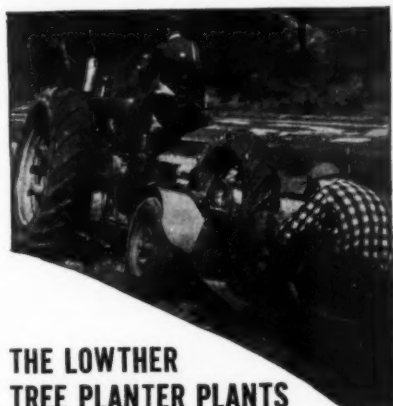
Any select variant or hybrid that can be propagated vegetatively, can be multiplied and used immediately because the vegetative offspring of a single individual have exactly the same hereditary characteristics as the original tree. Where the desired characteristic depends upon the roots (such as vigor, resistance to root diseases), the tree must obviously be propagated from root or stem cuttings—that is, it must be grown on its own roots. Where only the top is involved, the selected tree may be grafted or budded.

Vegetative propagation involves one very serious hazard because every member of a vegetatively propagated clone not only inherits all of the parental excellence, but also inherits all

of the parental weaknesses. A select clone may be susceptible to some disease, insect, or unusual climatic condition to which it was not exposed during the trial period. If such a condition arose after a single clone had been widely planted, mortality could be extremely high because every single individual would be equally susceptible. This hazard can be eliminated by interplanting a large number of select clones, and this will necessitate comprehensive breeding, selection and testing projects.

Shade Tree Research Must be Evaluated and Balanced—I would like to stress once again the urgency for collation of existent research findings and the essentiality of additional co-ordinated, and very closely co-ordinated, investigations on all fronts. The basic questions: how does a tree grow and reproduce?—what factors affect its growth and reproduction?—how can these factors and their effects be accurately measured?—can only be answered by weaving together basic information from all research fields.

And as indicated in my previous article, I believe this can best be accomplished through a clearing house for shade tree research—a national shade tree service.



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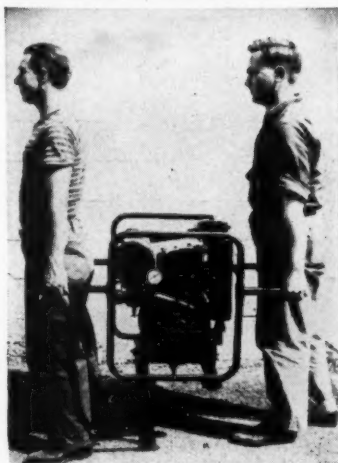
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This Month With The AFA

Randolph G. Pack of Darien, Connecticut, president of the Pack Forestry Foundation, and Samuel T. Dana of Ann Arbor, Michigan, dean of the School of Forestry and Conservation, University of Michigan, have been elected vice-presidents of The American Forestry Association for one-year terms. Sephus S. Golden of Washington, D. C., assistant cashier of the Riggs National Bank, has been named assistant treasurer.

This action was taken by the Board of Directors meeting in Washington on February 7 and 8. Mr. Pack, a director of the Association since 1943, and a vice-president since 1947, was re-elected. Mr. Dana, a director since 1935, succeeds W. B. Greeley, vice-president of the West Coast Lumbermen's Association.

The by-laws of the Association, as amended in 1945, provide for the election by the Board of two vice-presidents, in addition to the twenty-one honorary vice-presidents elected annually by vote of the membership of the Association. First named to this office in 1946 were Mr. Greeley and Karl T. Frederick, chairman of the Board of the New York State Conservation Council. In 1947 Mr. Greeley was re-elected and Mr. Frederick was succeeded by Mr. Pack. Both Mr. Greeley and Mr. Pack were re-elected in 1948.

Other important action by the Board at its February meeting endorsed by resolution the proposed amendments to sections 1, 2, 3, 4 and 5 and new section 10 of the Clarke-McNary Act (basis for federal-state cooperation in forestry), with the exception that federal allotments of funds to states be made on the established principle of requiring full matching funds by the respective states.

Sections 1, 2 and 3 deal with forest fire protection and, if amended as proposed, would authorize a progressive increase in federal appropriations, to be matched by the states, from the present \$9,000,000 to \$20,000,000 by 1954. Section 4, if amended, would authorize increased federal appropriations for tree planting, on a matching basis, from the present \$100,000 to \$1,000,000 in

1950, and \$2,500,000 by 1953. Section 5 would increase Extension Service appropriations for educational work throughout the various states from \$100,000 to \$2,500,000 by 1953. However, \$10,000 of this would not have to be matched by the states—and it is this the Association's Board of Directors take exception to. The proposed new section 10 would authorize up to \$6,000,000 by 1954 to further on-the-ground assistance through state foresters to owners of small forest properties.

In line with its endorsement of Clarke-McNary amendments, the Board voted to continue its Federal-State Cooperative Committee, established in 1948 to study federal-state cooperative forestry work as a part of the development of its Program for American Forestry. Vice-President Dana is chairman of the committee; the other two members are S. G. Fontanna, deputy director of Michigan's Department of Conservation, and president of the Association of State Foresters, and R. E. McArdle, assistant chief, in charge of State and private forestry, U. S. Forest Service.

The following items in the Association's

program involve state-federal cooperation:

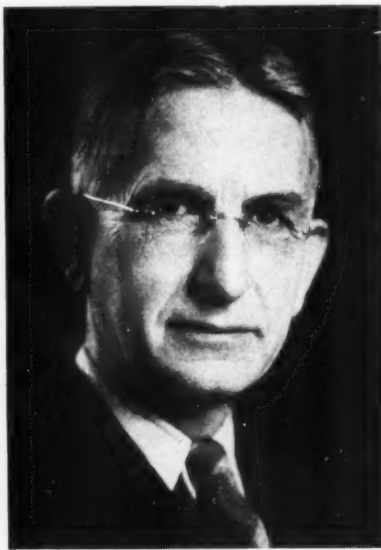
Aggressive development of cooperative protection under the Clarke-McNary Act; cooperative legislation for the control of insects and diseases; nationwide expansion of forest management programs for owners of small woodlands; advice and assistance to small wood-using industries; expansion of tree planting; expanded research in timber growing, harvesting and use of wood; and continuation of forest survey with aggressive action by individual states.

Renewal of the cooperative agreement for joint program work between The American Forestry Association and The Ohio Forestry Association was also approved by the Board, along with a resolution commending the officials of the Ohio association for developing an aggressive action program for their state.

The Board also voted to extend the present intensive membership campaign of the Association for six months. This campaign, in twelve months, has increased the Association's membership from around 15,000 to nearly 25,000.

A highlight of the meeting was the report of the Editorial Advisory Committee established by the Board last October to outline definite proposals for expansion and improvement of AMERICAN FORESTS. Members of this committee are Lloyd E. Partain, manager, commercial research

Elected AFA Vice-Presidents



Samuel T. Dana—University of Michigan Forestry School



Randolph G. Pack—president, the Pack Forestry Foundation

AMERICAN FORESTS

division, Curtis Publishing Company, chairman; S. L. Frost, executive director of The American Forestry Association; Tom Gill, secretary of the Pack Forestry Foundation, and internationally known writer; Theodore S. Repplier, president of The Advertising Council, Incorporated; Troy Rodlun, membership specialist, and William Vogt, chief of the conservation section, Pan American Union, and author of the best-seller *Road to Survival*.

Annual Report—In reporting on Association accomplishments and activities during 1948, Executive Director Frost brought out that 12,680 new members were added as the result of a stepped-up campaign under the direction of Troy Rodlun, membership specialist, who served on a consultant basis. On December 31, the membership of the Association totaled 24,816 as compared with 15,800 at the beginning of the year—a growth of sixty-three percent. Sixty life and one patron members were added.

AMERICAN FORESTS was read by more people in 1948 than in any previous year. A total of 263 thousand copies were printed as compared to 200 thousand in 1947, or a five-year average of 170 thousand copies. Cost of production was \$60,000. Income from advertising was slightly over \$22,000.

One hundred and twenty-three feature articles were published during the year. Sixty percent dealt with forestry or forest products—the remainder with soil erosion, water and range conservation, wildlife, recreation, nature appreciation, etc.

One out of every three feature articles published in *AMERICAN FORESTS* during the year was reprinted. The total number of reprints was 68,250, of which nearly 38,000 were purchased for distribution by agencies, organizations, industries and individuals. The remainder were reprinted by the Association for educational distribution.

Among the Association's books, *Knowing Your Trees*, by G. H. Collingwood and Warren D. Brush, continued to be the most popular. More than 4,000 copies were sold, an additional 10,000 copies (membership edition) were distributed free to new members. *Teaching Conservation*, by Ward P. Beard, designed as an aid to the teaching of conservation in the schools, was issued early in the year. Five thousand copies were printed. Sales to teachers, school libraries and conservation workshops have been

satisfactory. A mimeographed service *Conservation Outlook*, a review of important conservation legislation, and other developments, was inaugurated late in the year.

Other Association publications include the books *American Conservation*, edited by Ovid Butler, and *Managing Small Woodlands*, by A. Koroleff and J. A. Fitzwater; and the bul-

the Association, along with four other distinguished American conservationists: Henry S. Graves of New Haven, Connecticut; Robert B. Goodman of Marinette, Wisconsin; Tom Wallace of Louisville, Kentucky, and J. N. "Ding" Darling of Des Moines, Iowa.

During the year the Association made considerable progress in help-



A NEW GAVEL FOR A NEW ASSOCIATION PRESIDENT

Association President A. C. Spurr was presented a brand new gavel and sounding block before presiding at his first Board of Directors meeting in February. Walter C. Gumbel, chairman of the West Virginia Forest Council, made the presentation, citing the record of leadership in conservation of a fellow West Virginian. The gavel and sounding block are made of West Virginia black walnut. (Mr. Spurr at right).

letins *Forest Resources of the Douglasfir Region*, *Trees Every Boy and Girl Should Know*, *How to Plant a Memorial Forest* and *Trees of the District of Columbia*. These, together with fire prevention book matches, had wide distribution in 1948.

The Association's Trail Riders of the Wilderness successfully completed ten expeditions in the wilderness areas of six states—California, Colorado, Minnesota, Montana, Idaho and Washington. Number of men and women participating in these wilderness pack trips totaled 197.

Members of the Association's staff were in heavy demand throughout the year to fill speaking engagements, while requests for information at its Washington office required a total of 2,500 letters.

The annual meeting at Chattanooga, Tennessee, in October attracted members from twenty-six states. A highlight of this conference was the presentation of a Conservation Award to Senator Arthur Capper of Kansas. The senator was also elected to honorary membership in

ing state forestry groups develop stronger conservation programs. The Association's Forest Program Committee contributed to the development of a long-range and short-range action program for the Ohio Forestry Association, and funds were allocated to aid in their development. Other states in which the Association's forester is cooperating in the development of forest programs are Mississippi, Maine, Illinois, Iowa and Pennsylvania.

The Association's forester has also kept abreast of legislation. During the second session of the 80th Congress he appeared before the Committee on Appropriations of the House and Senate, and before subcommittees on Agriculture and Forestry in support of federal-state cooperative programs and management of the national forests. At the request of the Association of State Foresters, he launched a legislative reporting service—which is available to members of the Association upon request.

EDITORIAL

Straight Ahead, Mr. Hoover

THE first report on conservation activities submitted to Congress by the Hoover Commission strikes at the heart of a condition that has long handicapped the nation's efforts to achieve better land use practices. This is our penchant for becoming so absorbed in who should do the conservation job that we lose sight of what is happening on the land. The inevitable result is that many well-conceived programs flounder on the rocks of bureaucracy, jealousy, politics and greed.

As we have pointed out before, in the final analysis the application of effective conservation to our land resources boils down to a set of problems and suggested solutions. Who should do the job is of secondary importance, a question mainly of function and fitness of any bureau, agency, or department to carry out responsibilities with a minimum of confusion, conflict and waste of the conservation dollar.

In its late February report on the activities of the Department of Agriculture, the Hoover Commission lost little time in getting down to cases on this score. To "secure more concentration in the responsibility of direction, elimination of overlap, conflict and waste," it recommended a better grouping in the Department of activities related to the same major purpose.

It proposed, for example, that all major soil, range and forest conservation agencies in the Department be brought into an Agricultural Resources Conservation Service. It recommended a reconstituted Extension Service to more effectively promote federal and joint federal-state educational, demonstrational and informational activities. It urged that basic research activities be brought into a Research Service.

Furthermore, to coordinate activities in the field, it recommended a thorough overhauling of the Department at state, county and farmer levels.

And, really getting down to brass tacks, the Commission urged "that conservation payments to a farmer should be restricted to those which will bring about the adoption of complete and balanced conservation programs on his farm." Furthermore, that such payments "should not be used as income supplements in dis-

guise," and "when the conservation plan on any farm has been completed, such payments to the owner should stop."

But where the Commission displayed greatest foresight and courage was its approach to the "long and wasteful conflict and overlap between certain soil conservation, range, forest and allied services due to the division of their functions between the Department of Agriculture and the Department of the Interior."

As a case in point, it cited the re-vested Oregon and California railroad lands in western Oregon, where both the Bureau of Land Management of the Department of Interior, and the Forest Service of the Department of Agriculture, conduct separate forest management programs on intermingled lands.

Not only do two sets of regional and local forest officers carry on these duplicating programs, but "the conflict extends to payments made to local governments in lieu of taxes normally collectible on privately owned lands."

The Hoover Commission's solution is realistic and direct: consolidate the two agencies. But this is not all. "This Commission believes that logic and public policy require that major land agencies be grouped in the De-

partment of Agriculture. It recommends that the land activities of the Department of the Interior, chiefly the public domain (except mineral questions) and the Oregon and California re-vested lands be transferred to the Department of Agriculture and that the water-development activities (except the local farm supply of water) be transferred to the Department of the Interior."

Whether or not this formula of fitting the agency to the job rather than the job to the agency holds up under pressure of self interest remains to be seen. Some indication of what it is up against may be seen in the Dawson Bill, H.R. 2361, granting the President authority to reorganize his executive departments, presumably along lines recommended by the Hoover Commission. This bill passed the House on February 7 with ten agencies exempt from its blanket reorganization authority, among them the Corps of Engineers and its wide-field dam building program.

Thus it looks as if the time has come for the people of America to become constituents of a purpose rather than of a bureau, agency, or department. Unless they do, Mr. Hoover's good fight to give them more conservation for their conservation dollar may go for naught.



"Good work, Herb—but watch those reefs!"

BOOKS PUBLISHED AND RECOMMENDED

BY THE AMERICAN FORESTRY ASSOCIATION

Knowing Your Trees

BY COLLINGWOOD AND BRUSH

THIS edition includes 150 important American trees. This beautiful and informative book is now more graphically illustrated than ever before. More than 800 illustrations include actual photographs of each tree, its leaf, bark, flower and fruit, along with complete descriptions of its range, habits, uses and identifying characteristics. Designed for reading convenience, it is also beautifully printed, with colorful cover and dust jacket. Clothbound, size 12 x 8 $\frac{3}{4}$ ", 312 pages. **PRICE \$5.00**

American Conservation

BY BUTLER

AMERICAN CONSERVATION is the story of America—its land, its resources, its people. Beginning with the story of the ages, AMERICAN CONSERVATION presents for your knowledge and enjoyment the complete story of the conservation of the organic natural resources of our country. Briefly told, with more than 200 graphic illustrations, it is a story which will appeal to young and old alike. Clothbound, size 12 x 8 $\frac{3}{4}$ ", 160 pages. **PRICE \$2.50**

Teaching Conservation

BY BEARD

DESIGNED especially to provide teachers with the basic understandings for effective teaching of conservation in the school, this book sets forth (1) a proper concept of conservation by use of certain facts about natural resources and (2) the educational principles to be followed in using natural resource information to give students an understanding of conservation. Illustrated, 144 pages. **PRICE \$1.50**

Managing Small Woodlands

BY A. KOROLEFF WITH THE COLLABORATION OF J. A. FITZWATER

HERE is a practical, simply written handbook for the profitable use of forest land. If you own, manage, or plan to acquire forest property you should have a copy of MANAGING SMALL WOODLANDS—the guidebook to woodland improvement and harvesting. Learn how to make your woodland pay cash dividends year after year. **PRICE \$1.00**

Trees Every Boy and Girl Should Know

BY FADER

THIS book of drawings pictures 38 hardwoods, 38 evergreens, and in addition, 23 famous American trees, such as the Cambridge Elm, the Charter Oak, the oldest tree, the Nation's Christmas Tree. Pocket size 3 x 8 $\frac{1}{2}$ ". **PRICE 50c**

ALSO, FOREST RESOURCES OF THE DOUGLAS FIR REGION	\$1.00
REPORT ON SUPPLY AND PRODUCTION OF WOOD POLES IN THE U. S.	40c
TREES OF THE DISTRICT OF COLUMBIA	35c
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